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Extended Techniques for Intermediate Violin Students

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EXTENDED TECHNIQUES FOR INTERMEDIATE VIOLIN STUDENTS

A Dissertation

Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirements for the degree of Doctor of Musical Arts

in

The College of Music and Dramatic Arts

by

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Abstract

As we reach the end of the second decade of the 21st century, the performance of contemporary music is not a novelty in any concert hall. American orchestras frequently include contemporary works in their programs, and music schools offer specialized classes, ensembles, and even full degrees dedicated to contemporary music. However, for the violin, there are very few resources explaining extended techniques and other recent aesthetic innovations in a didactic manner. Most of the available material is directed at the advanced student or professional player. On the other hand, traditional instructional material often barely glosses over the 20th century repertoire, and virtually ignores the past 50 years of music history. This leaves young violinists unprepared for (and sometimes even unaware of) the challenges of contemporary violin music.

This dissertation intends to be a resource on didactic material on the subject of violin extended techniques, directed at intermediate violin players. The objective of this material is to aid teachers in the elaboration of introductory lessons on subjects related to contemporary music. The discussion is centered in techniques that relate immediately to basic violin instruction, namely: left hand patterns, contractions and extensions, shifting, glissando, microtonality, vibrato, trills and tremolo, harmonics, changing dynamics, changing tone color, *sul ponticello*, *sul tasto*, bow pressure, *pizzicato*, and *col legno battuto* and *col legno tratto*. For each technique, this dissertation presents a definition and explanation from the point of view of the mechanics of violin playing, suggests exercises, and provides accessible related excerpts of music of the 20th and 21st centuries for classroom use.
Introduction

Violin-like instruments were popular long before the establishment of the standard violin family, and the European violin, as known today by classical musicians, is essentially the same since the great violin makers of the 16th century. As opposed to wind, percussion, and brass instruments, the violin has been sparingly touched by modern technology. As a result, the modern violinist draws from a solid teaching tradition and a large body of masterpieces dating as early as the beginning of the 17th century. In fact, most pieces considered today to have been tested by time were written over a hundred years ago. These pieces are still important, and suffice to educate a violinist on most intricacies of the instrument. In other words, violinists can easily remain focused on the past.

However, the repertoire has never ceased to grow. Nowadays, American orchestras frequently include contemporary works in their programs (even though they are not usually central parts of the concerts), and music schools take increased efforts in building curricula more inclusive of styles outside the usual block of masterworks, offering specialized classes, ensembles, and even full degrees dedicated to contemporary music. With more recognition of modern and contemporary music, one would think the teaching of new technical skills would also become more widespread. For violin, however, there are very few thorough resources explaining the basics of extended techniques - in English, there is only one publication available to the general public specifically about violin techniques: *The Contemporary Violin: Extended Performance Techniques*, by Patricia and Allen Strange. Dissertations, etude pieces and study books are often written for the advanced student or professional player. Among other
publications, much is theoretical instead of practical; therefore, teachers of younger students or intermediate players continue to use mainly works from previous centuries. While this method of instruction will shape an able professional violinist, it barely touches the 20th century repertoire, and virtually ignores the past 50 years of music history. This leaves violinists unprepared to perform (and sometimes even unaware of) aesthetic innovations of contemporary violin music.

With the lack of introductory material, the intermediate players’ options are to either not play modern and contemporary music until they or their teachers feel they have mastered traditional techniques to a sufficient level, or to approach the task without awareness of the necessary skills and “reinvent the wheel”, often with unsatisfactory results. This dissertation intends to help fill in this gap, collecting materials and resources that relate contemporary music innovations to basic violin technique in a way that facilitates its inclusion in traditional teaching. This way, intermediate students can become familiar with certain composition and notation styles, and will not need to independently research a difficult technique or uncommon notation for the first time in a pressure-driven situation, such as a professional orchestra, music festival, or chamber music project.

Origins of violin technique as a subject

Around the early 1600s, music became “idiomatic” - written with a specific instrument in mind. Idiomatic violin music of this time included double stops, large melodic leaps, and continuous or contrapuntal writing - impossible features for the purely melodic vocal style of the Middle Ages. As violin music grew in complexity, the subject of violin technique and instruction
became more frequent, with the publication of methods, treatises, and easy pieces composed specifically for the violin student.

The first treatises describing performance practices of violin music were published in the Baroque period. Most of these documents offered explanations of general musical issues, such as style and ornamentation, and applied to several other instruments. Treatises specifically about the violin tended to be directed at teachers, discussing basic instrument technique and music theory.¹ This trend remained during the Classical period, with a rise on instruction methods and sheet music collections written for amateur players and, likely, semi-amateur teachers.² There are a few exceptional methods from the Baroque and Classical periods that are still consulted to this day, such as Geminiani’s *The Art of Playing on the Violin* and Leopold Mozart’s *Violinschule*. The majority of the methods, however, are now outdated, either due to changes in the instrument itself - for example, the introduction of the chin rest - or because they inspired later authors to provide superior explanations.

The 19th century saw the creation of the etude book, essentially a practical instruction book for the advanced player, and the publication of detailed violin instruction methods for all levels of proficiency.³ Etude books by Fiorillo, Dont, Rode, and Kreutzer, are essential parts of violin instruction; methods such as *L’Art du Violon* by Pierre Baillot and the *Graded Course of Violin Playing* by Leopold Auer are reference for school curricula to this day. The context in which these books appeared, however, was a conservatory culture that valued an intense routine of practice above all other aspects of music making - including reflecting on *how* to practice efficiently. The most popular 19th century etude books have “only” music, leaving the issue of

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² Ibid., 317-318.
³ Ibid., 357-360.
how to solve the presented technical problems up to the teacher, or to the student. In a way, as Milton Cherry says in his analysis of early 20th century violin pedagogic works, “they are of little more value to the student than are the same composer's concertos and concert pieces”\(^4\). Nevertheless, the idea of compositions made for study, focusing in one or a few techniques, was very influential to violin pedagogy.

In the 20th century, a multitude of different musical styles emerged. Modern music introduced harmonies that sounded unsettling, meter and accents that sounded unstable, and other musical expressions of a new appreciation of the less-than-beautiful sides of human emotion. With the increasing specialization of music careers, composers of violin music were no longer violin virtuosi themselves; that introduced new languages and new intricacies to violin playing. Later in the century, there were innovations that required entirely different aspects of musicianship from instrumentalists, such as interpreting visual scores, improvising, or using unfamiliar means of expression, such as vocalizations, secondary instruments, or theatrical performance. At the same time, with the advent of recording technologies, a universal standard of quality was born, and audiences became less accepting of poorly prepared performances. Considering this level of demands, the Romantic ideology of practising intensely until every technique has been understood became impracticable. This was reflected in modern violin teaching methods. Modern players needed new ways of looking at music teaching; the interest of the modern violin teacher, then, is to find ways to learn and retain large amounts of information efficiently. That resulted in Carl Flesch and Demetrius C. Dounis descriptions of the action and effect of minimal movements, such the angles of axial rotation of the left elbow, on tone and sound production; Kato Havas’ anatomical sketches, pointing out which muscles are involved in

each movement of violin playing; and Paul Rolland’s remedial technique method including medical research on neurological nature of voluntary muscle movements. Among these methods, one objective is common: they intend to use the player’s body, intelligence, and time entirely in their favor. While one can argue that carefree exploration with the instrument is important for expression, it is impossible to deny that this ideology has produced the best musicians in history.

Extended techniques in the 21st century

Extended techniques, or non-traditional ways of playing an instrument, have been common since the beginning of the development of the instrumental idioms. Carlo Farina’s Capriccio Stravagante, written in 1627, might be the earliest piece requiring techniques that we nowadays known as harmonics, staccato, pizzicato, tremolo and col legno. In the piece, the sounds are supposed to imitate different instruments and animals. As early as 1670, Heinrich Biber is also famous for using the violin in unusual ways, with similar extended techniques and scordatura. One may question: if extended techniques have existed for so long with little didactic explanation, why would it be useful now?

Today, one can hardly say that contemporary techniques and notations are curiosities, as they were in Biber’s time. While we are no longer witnesses to an influx of new avant-garde techniques, such as those in the second half of the last century, those innovations did not cease to be relevant; quite the contrary. Some are so well known among composers that parts do not include explanations at all, particularly in orchestral music. In a professional setting, a musician is to play, and sometimes sight-read, these techniques as if they were as familiar as any other.

Among all conservatory instruments, the violin seems to be further behind in the “acceptance” of contemporary music - the main reasons for which have already been mentioned in this text. However, it is important that violin students, teachers and professionals have more resources and experience with modern and contemporary techniques. To play or learn something for the first time is always difficult, and the first performance of a work that presents new issues is rarely ideal to the ears of most musicians, particularly for students. Negative experiences of going on stage unconvinced of the quality of your performance, from my observation, are often associated with “unidiomatic” music.

Nowadays, what defines a passage as idiomatic is not adaptation to the acoustic properties of an instrument, but adaptation to the musician. In other words, the term “idiomatic” has come to mean what trained musicians are used to playing. A technique that “falls easy on the fingers” is a technique that has been drilled since the beginning of the learning process. Expanding “idiomatic”, then, requires exposing musicians to newer techniques early, allowing diligent study and repetition to solidify them together with other important aspects of playing.

Methodology: Traditions of violin playing that have influenced this work

Due to the traditional nature of violin teaching, where instruction is passed on from master to pupil, there is little to “invent” that has not be based on teaching methods from the past. This paper in particular was heavily influenced by the pedagogy of Simon Fischer, Otakar Ševčík, as well as Carl Flesch’s extensive writings about violin technique, which I have been familiar with since my undergraduate studies in violin.

Throughout several of his works, Simon Fischer summarizes a truth about learning to play an instrument: it is not possible to focus on every aspect of playing at the same time when learning something new. Efficient study isolates individual aspects of technique until they are understood “on the raw”, and then progressively inserts it into different contexts - in scales and pieces, or in combination with other techniques - so it is seen from several different angles. The more practice a player has with different techniques, the less energy they concentrate in their mere execution, and the more they are able to focus on musical expression. Otakar Ševčík’s method of analyzing passages, visible in works such as his Analytical Studies for Brahms, Mendelssohn, and Tchaikovsky concertos, in conjunction with his etude and method books, are excellent intuitive applications of this ideology.

Carl Flesch, in his many books on violin technique, emphasizes constantly how much each technical decision in violin playing must reflect the composer’s intentions; his most adamant criticisms were to convenient, but anti-musical choices. The exercises on this paper address this issue by looking at several expressive possibilities of each technique, since players are more equipped to make musically-oriented decisions after practicing a technique in different contexts.

This paper was also influenced by Paul Rolland and Kato Havas, who were concerned with the musician’s ease of movement and well-being. Violin music of the 20th century and beyond has a few new general demands: first, a more flexible left hand; second, mastery of a variety of extreme tone colors and dynamic level changes; and last, the capacity of switching between different techniques quickly, but in a controlled manner. It is in the best interest of the performer to be able to build these skills paying attention to the mechanical nature of each movement, in order to not strain muscles and joints unnecessarily.
Reasoning for including and excluding techniques

While knowledge of the mechanics of technique is fundamental, music performance involves far broader subjects. Two of the most important aspects of the aesthetics of the music of the 20th and 21st centuries are the creation of different sonorities and new ways to notate them, as well as differing relationships between audience, composer, performer, and sheet music. Most of these compositional innovations bring challenges that are not specific to an instrument, but require a different concept of overall musicianship. Because space does not allow a discussion of all aspects of contemporary performance, this paper will discuss only the 20th century performance techniques that relate directly to traditional violin technique, being therefore easily woven in traditional teaching.

It is important to point out that this paper will not include a discussion of extended compositional techniques, although this is an important subject when considering the more recent violin repertoire. During the second half of the 20th century, the visual and performing arts exerted a direct influence on composers, impacting the role of the performer in relation to the score and the audience. Many of these pieces require the performance of percussive effects, vocalizations, alterations in instrument hold, or use of secondary instruments. In this kind of performance, the theatricality of the action can be as important as the actual sound effect they produce. Mastery of such artistry has little to do with the violin itself, let alone the mechanics of violin technique; for that reason, they will not be touched in this paper. Another aspect of innovative composition techniques is extended notations. While some information about extended notations has been included in this paper, many styles impact musical form and
ensemble dynamics more than the individual parts; therefore, a deeper discussion of extended notations exceeds the scope of this paper.

Aspects of basic violin playing, the most important ones being intonation, rhythm, and bow stroke articulations, are also not discussed in depth in this paper. The discussion of intonation in modern music can be lengthy because of the clash between the just intonation of string instruments and some systems of the 20th century that assume an equally tempered 12-tone scale. Violinists nowadays play in tune by balancing a perfect “vertical”, or harmonic intonation, with a perfect “horizontal”, or melodic intonation. Situations in which one is more relevant than the other are numerous. However, these debates are much better developed in person, instruments in hand, than described on paper. Rhythm, in a similar manner, is closely related with both the mechanics of technique and contemporary music; for this reason, issues of timing related to technique are much better understood (and solved) when observed in person.

Since bow strokes and articulations, such as staccato, martelé, and others are sufficiently discussed in traditional technique methods, this paper focuses on the techniques for which I did not find extensive material.

Finally, this document does not intend to evaluate or analyze the musical quality or relevance of the musical examples, but merely to approach the techniques in a matter-of-fact way. However, I myself have musical preferences, as well as strengths and weaknesses in regards to technique; these influenced the amount written about each technique, as well as the organization of the sections of each chapter. I also mention, throughout the paper, the pedagogic benefits of studying certain techniques for the violinist who might not take an interest to contemporary music. This is not intended to imply that these works have less merit on their own;

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quite the contrary, I hope teachers and students recognize them for their didactic value beyond their novelty.

Structure and organization of chapters

This dissertation has been organized in four main chapters. Chapters one and three discuss general issues related to individual techniques, such as history, notation, performance practices, and potential difficulties, both from the author’s experience and as addressed by violin pedagogues. Chapters two and four address the practical application of the pedagogical concepts discussed on the previous chapters. The excerpts are appended by exercises that I composed in my practice to address these issues. Some sections also have a small resource list, when applicable - for example, the section on harmonics has a list of published violin harmonic charts. Resource lists are organized by level of difficulty, from basic to advanced.

The first and second chapters are about techniques regarding the violinist’s left hand. Chapter one discusses the following aspects of technique: Left hand patterns: the octave frame; contractions, or hand patterns smaller than the octave; extensions, or hand patterns larger than the octave; double stops and chords; shifting; “creeping fingers” or retarded shifting; glissando; micro tonality; vibrato; trills and tremolo; harmonics; and left hand pizzicato. Chapter two groups some techniques into related subjects, for efficiency. Chapter two also includes four resource lists: the first is about extensions and stretches training; the second, about double and multiple stops including extensions and contractions; the third lists a few pieces and collections appropriate for intermediate students that purposefully deal with modern scales; and the fourth is a short list of published harmonic charts for the violin player.
Chapter three and four are about techniques of the right hand and bow. Chapter three discusses changing dynamics; changing tone color; *sul ponticello*; flautando or *sul tasto*; variations of bow pressure, tremolo; pizzicato; and *col legno battuto* and *col legno tratto*.

Chapter four divides the exercises in the following sections: changing dynamics; changing tone color; *sul ponticello* and *sul tasto*; bow pressure; tremolo; pizzicato; and *col legno battuto* and *col legno tratto*. 
Chapter 1: Left Hand

By the end of the 19th century, the standard violin hold was virtually universal among violinists of the Western tradition. Most violinists had some variation of chin rest set ups for more comfort and freedom on playing, and most of what is considered standard left hand technique now had already been established by the end of the 19th century. The standard technique includes the use of positions on all strings, including extensions up to a tenth and contractions; double, triple, and quadruple stops; natural and artificial harmonics, including harmonics in double stops; trills, vibrato, glissando, and left-hand pizzicato. In 20th century music, new techniques were created, but the traditional techniques continue to be employed. What has changed is the intensity and rapidity of alternation between techniques, new combinations between techniques, and different musical intentions.

This chapter will present recent developments in traditional left hand technique. The topics are organized from general to specific. The first few sections are about left hand patterns, the base of all fingering choices for the violinist: the basic octave frame, contractions, and extensions, as applied to melodic patterns and double stops. After that, the discussion continues with regular shifting, retarded shifting or “creeping fingers” technique, and glissando. Then, individual miscellaneous technical issues: micro tonality, vibrato, trills, tremolo, and harmonics.
Left hand patterns: the octave frame

Left hand patterns are a set of aspects of traditional technique that have not necessarily modified or expanded, but have been approached in different manners by contemporary composers and pedagogues.

The octave frame is the most basic violin left hand pattern. In this hand position, the second finger falls in an interval of a second in relation to the first finger; the third finger falls in a third; and the fourth finger falls in a fourth. Between one string and the next, the first and fourth finger result in a perfect octave, so one-octave major and minor scales can be played in a fixed position. The octave pattern is useful for most diatonic, tonal and modal melodies, as well as double stops in intervals between the major second and the octave; it is also used for artificial harmonics at the interval of fourth, which is the most commonly used artificial harmonic interval. Classically trained violinists use these one-octave scales as references on a mental-muscular map of the fingerboard - what we call positions. With the exception of the higher parts on the fingerboard, where the space between intervals becomes uncomfortably small, the octave frame is firmly conditioned in the kinesthetic sense of the violinist - which makes deviations feel odd to the touch.

Figure 1.1. Tablature of the B major octave frame.

This pattern is definitely paramount to modern and contemporary music, which is often diatonic; this is particularly evident in minimalism, and compositions that are influenced by folk tunes and popular music. However, having a good grasp of the technique behind stretching and
contracting fingerings is indispensable to professional string players. This is not only because modern and contemporary music require unorthodox fingerings more frequently. Contractions and extensions can help players avoid difficult string crossings and shifts. Beyond the issue of practicality, contemporary aesthetics considers distasteful the portamento effect that often results from shifting between positions. Consequently, performers tend to avoid shifts and slides in older music unless absolutely necessary. Therefore, contractions and extensions should be a concern of diatonic music as well.

Contractions, or hand patterns smaller than the octave

Contraction fingerings happen when the fingers are closer to each other than they are in the diatonic scale, in such a way that the octave frame feels compressed. This can only happen in the context of at least three notes separated by a semitone. Melodically, most contractions are chromatic fingerings.

![Figure 1.2. Tablature of a contraction.](image)

Likely the earliest surviving pedagogic document that explains chromatic passages the way we think of them nowadays - one should play each note on a chromatic passage with a separate finger, instead of sliding - is Francesco Geminiani’s treatise *The Art of Playing on the Violin*. Geminiani’s treatise, said to have been written in 1751, is one of the few violin treatises
of the Baroque period that is still a reference nowadays.\(^8\) Geminiani’s chromatic scales were not popular among 18th century violinists, who preferred sliding semitones to avoid disturbing the octave frame. The increasing chromaticism of the music of the Romantic era led violin pedagogues to rediscover Geminiani’s continuous chromatic fingerings, which were more practical for virtuosic passages.\(^9\) Geminiani’s fingerings are used by several technique and scale books of the 20th century, Carl Flesch’s *Scale System* and Ivan Galamian’s *Contemporary Violin Technique* arguably the most influential.

Extensions, or hand patterns larger than the octave

Extensions, on the other hand, happen when the fingering extrapolates the octave pattern. Any fingering that is larger than a whole step, involving any of the four fingers of the left hand, can be considered an extension. Forward extensions are common in music since the Baroque period, in particular the ones utilizing the octave harmonics in the third position. Backward extensions, however, are not as familiar for most violinists. Likely the most commonly uses of extensions are tenths and fingered octaves, which have been relatively common in violin music since the Romantic era. After them come unisons and ninths, which are more common in music with expanded tonality.

The facility of performing extensions depends on a balanced left hand. Within the context of an instrument held in such an unnatural position as the violin, a balanced position is one where the amount of torsion needed for fluent execution of fingerings is distributed through the


\(^9\) Pereira, “Twentieth-Century Violin Technique”, 1-5.
arm, wrist, and hand, in such a way that no parts of the system are overstretched or over-
tensioned. One of the most common guides to correct placement of the elbow, hand, wrist, and
fingers is the Geminiani grip:10

![Figure 1.3. Geminiani grip.](image)

The Geminiani grip itself may feel like an extension for a violinist trained on what Paul
Zukofsky calls the “neutral” position of the hand. The neutral position anchors the grip on the
first finger, reaching the smaller fingers as needed. This grip feels more relaxed for melodic
passages, since it requires less rotation of the forearm. However, according to Zukofsky, some
rotated positions and all extensions become “at best [...] impractical and uncomfortable [and] at
worst painful and dangerous to the hand”11 with the neutral grip. He advocates for the teaching
of the rotated position of the hand as neutral, so as to facilitate fluency with extensions. The third
and fourth finger, being weaker, should be anchored in position, and the first and second should
be flexible for backward extensions.

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11 Zukofsky, *All-Interval Scale Book*, iii.
Extensions can strain and tire the hand, leading to injury at worst. That is why they should be studied mindfully. Methods that suggest stretching from lower positions, such as Carl Flesch’s *Urstudien*, might work well for certain hand sizes and proficiency levels, but are definitely not well-suited for beginners or players with smaller hands. The latter should start from higher positions going down, for the level of stretching is more gentle and increases step by step as the hand goes down the fingerboard.

Double stops and chords

Double stops, or combinations of two or more notes played at the same time, can happen in any interval: within the octave frame, with extensions, or with contractions. They are more challenging than melodic fingerings, however, because there are additional issues for the ear, the left hand, and the bow.

Consistent study of double stops is important for the establishment of a balanced left hand, which is necessary for fluency in all left hand technique. Milton Cherry, in his dissertation about the impact of the works of O. Ševčík in violin pedagogy, mentions that stopping extra notes as double stops during melodic passages can help with fast passages, for “when three or four notes are fingered at the moment when the first note is bowed, a mental relaxation with
respect to the left hand can take place and only the right arm has to be directed by the mind\textsuperscript{12}. Because double stop and chord techniques are so important, there is an abundance of traditional instructional books and methods on the subject. This material, however, focuses on the double stops within the octave frame; even comprehensive resources have more substantial material about tonal and diatonic music. Double stops on extended, chromatic, or atonal harmonies often disregard the octave frame. In this context, the left hand must be more flexible to reach extensions and make them expressive; and the ear needs to get used to resolving the intonation of dissonant intervals.

The balanced left hand, discussed previously, becomes even more important in chords, or multiple stops, particularly its anchoring aspect. Kenneth Sarch, in his dissertation about 20th century violin technique, recommends thinking of chords as superimposed double stops, writing them down separately if necessary.\textsuperscript{13} To complement this, it is important that a student recognizes a hierarchy of the finger position according to the strengths and weaknesses of their own body, so they are able to “ground” the chord construction efficiently and in a logical manner.

Shifting

Shifting is movement up or down the fingerboard intended to reach notes that are inaccessible to the current position of the left hand. For many players, it is the most difficult part of left hand technique; the main reason being the amount of fine-motor coordination required.

\begin{footnotesize}
\begin{enumerate}
\item Cherry, “An Historical Survey of Violin Pedagogy and an Expository Study of Otakar Ševčík’s Theory of Technical Analysis”, 78.
\end{enumerate}
\end{footnotesize}
Shifting in lower positions is done mainly from the elbow joint, while shifts in higher positions involve the upper arm and shoulder joint as well. The angles of the elbow, wrist, and fingers change according to numerous variables every few fractions of an inch. The exact point where a new kind of movement is necessary depends on each player’s body; there is no universal rule of right and wrong. What we do have are general guidelines, most of which could be summarized by the phrase: “do not grasp.” The most common mistakes that prevent fluid shifting are gripping the neck with the thumb, and tension in any of the arm’s joints (most commonly the wrist, but tension on the shoulder or elbow will also make shifts feel “stuck”). Flexibility of the entire left arm system is essential for good shifting technique. Kenneth Lee Sarch mentions five main fronts of study aid for shifting: aural memory, or ear training (the player should be able to aurally hear the note they are to play next); kinesthetic memory (awareness and memorization of the feeling of the shift); visual memory (using visual points on the fingerboard as reference); awareness of the shifting curve (which might involve both kinesthetic and visual memory); and the use of intermediary notes.14

In his book *Principles of Violin Teaching and Playing*, Ivan Galamian describes all deviations from the octave pattern as shifts. According to Galamian, the difference between “complete shifts” and “half shifts” is the movement of the thumb; while complete shifts move the entire hand, half shifts keep the basic hand position fixed, while stretching fingers up or down (therefore, essentially an extension).15

Shifts and extensions are indeed very closely related. When choosing fingerings, the player is constantly deciding whether they will use one or the other. In some situations, however, the choice has already been made - for example, when the note is out of reach, or when the

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composer demands that an interval be played only in a specific string, creating leaps, or shifts in large intervals. In certain styles of modern and contemporary music, large shifts are very common, either because of compositional techniques such as octave displacement, or because the composition explores the different timbres of the same pitches played by different strings. Larger shifts need very diligent training for the muscular memory to be established.

For shifting training, the 20th century produced a number of good methods, the most famous of which being Changes of Position and Preparatory Scale Studies, Op.8, by Otakar Ševčík. Carl Flesch observes that, before Ševčík, “the technique of shifting positions had definitely lagged behind other branches of violin technique”, so players used forward extensions more often. After Ševčík, the expressive power of glissando became known to a large number of instrumentalists, and “perhaps overused.”16 Ševčík’s system is popular because it is accessible; each new section of exercises begins with small shifts in unisons, progressively advancing to larger and faster shifts, while surveying a large portion of the fingerboard - which makes it a valuable resource for all levels of shifting skills. Another important method of shifting are The Artist’s Technique for Violin Playing, by Demetrius Dounis, which takes the opposite approach: large intervals are tackled immediately, with octave shifts and changing fingers. Shared by both approaches is the use of intermediary notes, which can be applied to any kind of shift. In this strategy, one finger is chosen as the pivot of a shift, leading the movement of the hand from one position to the next. Pivot fingers are always the lower fingers, even in upward shifts. The pivot finger is chosen using a few criteria. First is familiarity: players prefer to stay within positions that are more solid in their muscular memory, for there will be fewer mistakes. Second, harmonic sense: if the pivot note is part of the harmony of the passage, the new note will likely be easier to

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listen aurally, and therefore play in tune. Last, convenience; if the new position is advantageous to the rest of the melody, unnecessary consecutive shifts are avoided.

Carl Flesch discusses intermediary notes in a different way: instead of using harmony or the scale as the shifting logic, intermediary notes should fall in a mechanically sound position - in other words, wherever position is natural for the hand.\textsuperscript{17} This might mean notes outside the chromatic scale. This idea is not good for every violinist; in order to execute this kind of shift, the player needs to have solid aural skills, so their sense of intonation is not disturbed. A different approach, closer to Dounis’ method, is the idea of missing a shift on purpose, in order to build a mental map of the fingerboard. Adrian Eales, in this essay \textit{Fundamentals of Violin Playing and Teaching}, says: “To ‘miss’ a target you must know where it is; once you gain control, you can choose whether to ‘make it’ or not”\textsuperscript{18}. This kind of practice can be very useful to solve shifting issues, if done mindfully.

“Creeping fingers” or retarded shifting

Creeping fingers, also known as retarded shifting, happens when an extension or contraction pivots the movement of the hand to a new position. Contrary to extensions, contractions, and shifts themselves, retarded shifting is not an event between two notes, but a process that involves a high degree of flexibility of the fingers and wrist. Ivan Galamian refers to retarded shifts, or any event where the fingers move up or down on the fingerboard before the

\begin{footnotes}
\end{footnotes}
thumb, as being “in between half shifts (stretches) and complete shifts.”\textsuperscript{19} Carl Flesch names the technique “creeping into position”, describing it as a movement lead by the finger, while the hand and the arm “creep” behind.

Flesch also relates the technique to modern music, saying that, in the 20th century, there was a strong reaction against excessive glissando, which prompted players to use more stretches and creeping fingers.\textsuperscript{20} While that can definitely be a factor, there are certain aspects of contemporary music that address this issue on their own: whole tone and octatonic scales, for example, are not “anchored” in one single position, for their perfect fourth and perfect fifth relations do not comply to the octave frame. While fingering choices are debatable and will vary from player to player, retarded shifts are almost unavoidable in certain styles of chromatic music.

Glissando

Close to the subject of shifting is the subject of glissando and portamento. The Italian words, meaning “to slide” and “to carry” respectively, describe the act of connecting two notes without hiding the notes in between, or showcasing them with expressive purposes.

There is not a clear agreement on the definition of glissando and portamento among pedagogues of bowed instruments. The terms are often used interchangeably, but several important figures have attempted to differentiate them. The differentiation that David Boyden and Robin Stowell give in the Oxford Music Dictionary is that glissando will emphasize notes of interest (much like the piano or harp glissando), while the portamento is a sliding effect that

\textsuperscript{20} Flesch, \textit{Violin Fingering: Its Theory and Practice}, 80.
simply passes through infinite sounds between two notes. According to this definition, glissando and portamento have very different expressive objectives, and glissando is supposedly much harder to execute than portamento.\textsuperscript{21} For Carl Flesch, glissando and portamento are different expressions of shifting. He differentiates glissando and portamento by defining glissando as the mechanical action of shifting (with or without its sonic residues), while portamento is a purposeful, expressive connection between two notes. Flesch uses the term \textit{chromatic glissando} to describe the staccato kind. Sol Babitz agreed with Flesch, adding that calling the articulated slide a glissando “burdens the term glissando”.\textsuperscript{22} Ivan Galamian, on the other hand, uses the terms interchangeably, highlighting that the terms are only fit to describe purposefully expressive shifting.\textsuperscript{23} Strange and Strange disagree with the strict “academic” definition between the two words, explaining that it does not quite make sense for the violin: “For a string player a glissando is not scalar, and the musician does not have to sing.”\textsuperscript{24} They attribute the name glissando to any sliding movement on the string, whether it is fast or slow, deliberate or intended to be hidden.\textsuperscript{25} In this paper, I will use the definition given by Strange and Strange, specifying differences in intention, speed, and sonority as needed.

The notation convention for the common glissando is a straight line connecting noteheads (figure 1.6), for which the most common variation is a wavy line (figure 1.7).\textsuperscript{26} This common symbol might have particular meaning when combined with other symbols. For example, when glissando followed by a rest, the glissando itself is the effect; the last note may be written in

\textsuperscript{22} Sol Babitz, \textit{The Violin: Views and Reviews} (Fairfax, VA: American String Teachers Association, 1955), 8.
\textsuperscript{24} Patricia and Allen Strange, \textit{The Contemporary Violin: Extended Performance Techniques} (Berkeley: University of California Press, 2001), 79.
\textsuperscript{25} Strange and Strange do, however, differentiate glissandi from slides and bends used in fiddle, jazz, and rock violin; these slides are usually not larger than one step, and their objective is to imitate inflections of the human speech. Patricia and Allen Strange, \textit{The Contemporary Violin: Extended Performance Techniques}, 92.
\textsuperscript{26} This seems to be common only in certain French and Russian editions.
smaller font, or sometimes it is not written at all, making the sound effect open ended. Glissandi might also come with an arrow shaped note head, indicating the highest possible note of the instrument, or a X-shaped note head, indicating indeterminate pitch. This notation does not specify how much speed or finger pressure the composer intended the player to use; the differentiation will vary from player to player, and according to performance practices of the time. The main criteria to consider are the tempo of the piece, size of the shift, and expressive relevance of the passage.

![Figure 1.6. Common glissando notation.](image1)

![Figure 1.7. Glissando. Shostakovich Violin Concerto n. 1, 2nd movement, 7 before rehearsal 30 to rehearsal 30.](image2)

In graphic notation, glissandi are also notated as undulating lines tracing the approximate trajectory of the glissando (Figure 1.8).

Other variations of notation happen when the glissando intended by the composer is not the common sliding sound, but something else. The most common variation is the glissando jeté. It consists of a glissando on the left hand played with ricochet (bouncing) bow movement of the
right hand. Glissando jeté gives the impression of individual notes through bow articulation, therefore sounding more similar to a piano glissando than to a portamento. This technique is common in virtuosic repertoire of the Romantic era, being characteristic of show pieces by Wieniawski, Vieuxtemps, Sarasate, and other violinist-composers. A similar technique involves articulation of the left hand, in a movement similar to vibrato; this technique results in more definition of the pitches throughout the slide, although not as much as with the bow articulation.

Figure 1.8. Glissando jeté with microtonal undulating notation. Karel Husa *Sonata for Violin*, 3rd movement, m. 2.\(^{29}\)

Figure 1.9. Articulated glissando in double stops. Dmitri Shostakovich *Violin Concerto n. 1*, 3rd movement, 2 before rehearsal 80 to rehearsal 80.

For other extended glissando techniques, there is no universal convention; composers specify the intended sound on the front page of the score or by giving direct written instructions in the part. Many of these techniques consist in combinations of glissando with other techniques. Perhaps the most common involve combinations of glissandi with harmonics (figure 1.10).

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Strange coined the term “contrary glissando”, which is interesting both for the training of extensions, shifting, and glissando itself. The technique consist in double stop sliding in opposite directions, and making finger changes, when necessary, almost imperceptible.\(^{30}\) Another technique involving glissando is a technique called “vibrato-glissando”\(^{31}\) consisting in glissandi of quarter tones. Another sound that might be considered glissando is expressive tuning switches (scordatura).

A different issue with glissando is its “casual” use for expressive purposes, when it is not indicated on the score. The use of glissando among string players increased through the 19th century, reaching its peak of popularity at the turn of the 20th century. As early as 1834, violin treatises advised the tasteful use of glissando, especially in slow movements, in order to make the the violin sound more closely resemble that of the voice.\(^{32}\) In the first decades of the 20th century, performers famous for their generous use of glissando, such as Fritz Kreisler and Ephram Zimbalist, were extremely popular. However, at the same time, pedagogues were already warning against the excessive use of glissando. Carl Flesch was perhaps the most adamant critic of excessive glissandi in the early 20th century. He was particularly critical of

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shifts that result in sound, deeming them distortions of the musical passage, for they insert foreign sounds into the music. He also denounced the use of “portamento” by some players as a convenient way to make shifts easier, instead of being an expressive choice, calling it “omnibus glissandi” in a reference to the means of transportation. Through the 20th century, a cleaner aesthetics, with minimal use of glissando, became the norm - as one can hear in performances by Jascha Heifetz, David Oistrakh, and other virtuosi violinists of the generation after Fritz Kreisler. Nowadays, glissando is still in disfavor. Unless written on the score, glissandi are played fast and infrequently in the name of a cleaner sound. In orchestral playing, glissando is considered distasteful in the vast majority of musical styles.

Microtonality

Microtones are intervals smaller than a half-step. Microtonal systems can be comprised of any number of divisions of the sounds between an octave. Instruments in the violin family are technically able to perform any division of microtones. This paper does not intend to list or analyze all, but instead will focus on the most commonly used: microtonal systems congruent with the 12-tone system, calling for pitches between the half-steps.

Evidence of the use of microtonality is present in numerous treatises from ancient Greece up to the early baroque period. However, microtones were not used in Western concert music for centuries. Experimentation with microtonality began again in the late 19th century. Perhaps the oldest reference in the recent past was the book On the sensations of tone (1863), by Hermann Helmholtz, which discusses music traditions from the Middle East, North Africa and Asia,

among other subjects. In the 20th century, microtonality was embraced for its expressive potential. Certain composers invented complex systems with mathematically perfect divisions, some requiring instruments to be specially built, or even requiring electronic instruments, in order to be accurately performed. Roger Heaton, in his article *Instrumental Performance in the Twentieth Century and Beyond*, mentions that for some serialist composers, microtones function as a “saturation of the chromatic scale”, expanding the chromatic scale into a 24-tone scale that can go through different processes of serialization.  

Notation of microtones is not entirely standard. The most common notations involve arrows placed on the accidentals or note stems, or modified accidental signs representing half-sharps and half-flats.

Figure 1.11. Microtonal notation: altered accidental signs. Giacinto Scelsi *L’âme Ailée*, instructions.  

Figure 1.12. Microtonal notation: arrows on accidentals.

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36 © With kind authorization of Editions Salabert.
Figure 1.13. Microtonal notation: arrows by the noteheads. Karel Husa *Sonata for Violin*, 3rd movement, 2 before rehearsal 220 to 2 after rehearsal 220.

Microtones are easy to play and perceive within a scale, or when related to close intervals. In these situations, they may sound like voice inflections or bends, or make reference to folk music systems that are not tuned in the same way as diatonic scales. When microtones are employed in large leaps, however, they often end up sounding like poor intonation. In this context, they are also harder to perform, since there are no fingerings that separate microtones clearly from their surrounding notes, like in woodwind instruments. To execute these microtones, the string player essentially has to circumvent their muscular memory of the “correct” notes.

Vibrato

Vibrato, in violin technique, consists in varying pitch though small up-and-down movement of the left hand, causing an undulating effect on the sound. This pitch variation is conventionally very slight, involving mere fractions of a quarter-tone, so the technique is vastly different from that of shifting or glissando.\(^\text{37}\)

\(^{37}\) There are different techniques related to left hand vibrato, such as the bow vibrato, or measured vibrato, and the two-finger shake, described by 17th and 18th century treatises. These techniques are not in use anymore, and the author judges that the use of similar techniques by contemporary composers is not frequent enough to deserve much elaboration in this project. Some early literature uses the words *tremolo* or *shake*, as well as other less common names, to describe what is now called vibrato. For this paper, I will use the modern terminology.
Vibrato technique was described by many before the 20th century; often, with a warning about its overuse. Until recent times, vibrato was considered an ornament suited only for expressive passages. Recordings of prominent players from the turn of the 20th century, like Joseph Joachim or the young Fritz Kreisler, barely have any vibrato. However, two generations later, continuous vibrato prevailed in both solo and orchestral playing, as observable in recordings of virtuosi players of the 1930s and 1940s. Players like Jascha Heifetz and David Oistrakh established a new standard of excellent violin sound, warm and dramatic, that included constant vibrato. By the mid 20th century, the greatest players of virtually every instrument valued vibrato as a fundamental component of good sound. In the Oxford Music Encyclopedia Online, Greta Moens-Haenen correlates the increased use of continuous left-hand vibrato with the popularization of the use of metal strings instead of gut strings. The sound of metal strings, by its nature more piercing and strident, called for “sweetening” - which was one of the earliest names for vibrato - thus instituting constant vibrato as the norm. In some kinds of modern repertoire, vibrato is an expressive device on itself. Composers now may ask for no vibrato on the score, or for nuanced and sudden changes of width and speed, previously considered only for individual study.

Vibrato is not usually notated, unless it is an integral part of the musical intention of a piece, or for instructional purposes. Leopold Mozart’s Violinschule and Louis Spohr’s Grand Violin School discuss vibrato, even mentioning the different vibrato qualities, each with their own

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notation, for different speeds, including vibrato crescendos and diminuendos. The notation of vibrato used by composers nowadays is very similar to Mozart’s and Spohr’s notation: an undulating line above the staff (Figures 1.14 and 1.15).

![Figure 1.14. Vibrato. Louis Spohr Grand Violin School, Exercise 29.](image)

Figure 1.14. Vibrato. Louis Spohr *Grand Violin School*, Exercise 29.

![Figure 1.15. Vibrato. Giacinto Scelsi L’âme Aimée, m. 1 to 2.](image)

Figure 1.15. Vibrato. Giacinto Scelsi *L’âme Aimée*, m. 1 to 2.

Developing a good vibrato is one of the milestones of the intermediate/advanced student. There are numerous traditional strategies to introduce students to vibrato passed down from teacher to pupil. I do not intend to elaborate much on them on this paper, because learning vibrato is part of the long and complex process of developing good left hand technique. Walter

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Kolneder affirms that “a really well-executed, continuous vibrato is rare, even among concert violinists.”

Most teachers are against the constant use of vibrato during practice. Sol Babitz opposes teaching vibrato, generally speaking, until the student shows “a prolonged disinclination to start vibrating on his own accord”. He says most students will sooner or later develop vibrato on their own, and trying to teach it too early might be more detrimental than helpful. I agree with him in the sense that, in my experience, trying to teach vibrato too early may generate mental blocks and bodily tensions, due to hyper awareness, that seem to hinder the organic development of a flowing, relaxed technique. However, constant vibrato, as well as the capacity of executing variations on vibrato speed and width, need a specific kind of training, that should be included in scale study. Babitz mentions that, for the violinist who is unhappy with his tone, exercises by Achille Rivarde and Carl Flesch might help; he adds, however, that the student should try this on their own, to avoid the interference of the teacher’s taste in their individual voice.

Trills and Tremolo

While seemingly very similar, there are clear distinctions between a trill and a left hand tremolo. The trill is an ornament that consist of the alternation between two notes, usually a half step or whole step apart, under a slurred bow stroke. The tremolo of the left hand is an alternation between two notes in intervals larger than a whole step. Even though the tremolo and trill are mechanically similar, their expressive objectives are different. The trill tends to appear in higher voices and loud passages, creating or emphasizing harmonic tension, especially in

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cadences or ends of phrases; the tremolo, on the other hand, usually serves as a harmonic foundation for the melody, set more often to the middle voices and soft passages. Trills are usually measured, while tremolos can be measured or unmeasured.

Notation is relatively standard for tremolo and trills, with a few variations. The trill symbol may be followed by a wavy line, signaling that the trill must be maintained fast and energetic until the end of the note. Other common variations in trill notation are related to the trill interval or trill ending. Indications of a different note for the trill are usually in the form of an accidental atop the tr sign; indications of extra ornamentation at the end of a trill are usually written in smaller notation after the note.

Figure 1.16. Possible notation styles of left hand tremolo.

Figure 1.17. Traditional notation of trills.

Figure 1.18. Variations in trill notation.

In modern music, trills and tremolos on dissonant intervals may require extensions or contractions; this becomes particularly awkward if they happen in double stops. More complications come when trills and tremolos are combined with other left hand techniques such
as glissandi or harmonics, or paired with difficult bow strokes. Nevertheless, the basic principles of the technique remain the same.

There is a wealth of works from the Romantic period and earlier that explore complicated trills in tonal settings. Some good examples are Giuseppe Tartini’s *Devil’s Trill* Sonata, or the trill sections on the Violin Concertos by Piotr Ilitch Tchaikovsky, Felix Mendelssohn, and Johannes Brahms, to mention just a few of the most well-known examples. Many of these are challenging enough to develop the technique necessary to face modern repertoire. Some might argue that there is little benefit in introducing a student to trill passages in modern music if they still have difficulty with trill passages within the octave frame. Advanced students, on the other hand, can benefit in several ways, from developing a relaxed finger dropping technique in hand frames different than the octave, to aiding with endurance in long or difficult passages.

Harmonics

According to the Oxford Music Dictionary, harmonics are defined as “sets of musical notes whose frequencies are related by simple whole number ratios.” Describing the physics and mathematical principles of harmonics in relationship to timbre and sound production is an arduous task, already tackled by specialized books and articles; moreover, the real-life relevance of deep knowledge on the subject for performers is debatable. Therefore, this document will be concerned only with the practical aspects of performing harmonics on the violin.

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When a string is pressed at certain proportional spots of its length - namely fractions of half, thirds, fourths, fifths and sixths - individual vibrational waves of the harmonic series can sound as isolated notes. These spots will be called nodes from now on. In the violin, harmonics are produced by touching one of these nodes very lightly, usually with the flat part of the finger, while bowing normally. Pressing the node too much will result in a gritty sound of mixed harmonics, without reaching the full resonance of a stopped note.

In string instruments, harmonics can be natural or artificial. Natural harmonics are produced from an open strings - each node along that fraction produces the same note - while artificial harmonics are produced from a stopped string. The physics principle is the same; stopping a new note alters the length of the string, creating a new fundamental. With natural harmonics, players have more freedom to use different nodes along the length of the string, while with artificial harmonics they are limited by their hand span.

The timbre of harmonics can be characterized as being softer and thinner, being comparable with the “head voice” of a singer, as opposed to the “full voice” of a stopped note. In fact, according to Robin Stowell, harmonics were common a long earlier than the Classical period, but they were not entirely accepted as an expressive device because of its “inferior tone quality”, and only after violin virtuosoi such as Paganini that the public started to be really interested in them.\footnote{Stowell, “Technique and Performing Practice”, 131.} In the 21st century, composers make use of harmonics expressly because a weaker tone is desired for transparent and delicate sections.

There are a few regular notation styles for harmonics. Some only indicate the stopped and touched notes, and some indicate the actual pitch as well. Figure 1.19 is the ideal notation of harmonic for string instruments, as recommended by Kurt Stone in his book *Music Notation in the Twentieth Century: A Practical Guidebook*. This notation includes the result sound, in
parenthesis, as well as the “harmonic tablature”: a regular notehead representing the stopped note and diamond-shaped note head representing the harmonic position. Richard Strauss, in his revision of Hector Berlioz’ *Treatise on Instrumentation*, states that the notation style that includes the sounding note above is “no longer necessary”, and makes the score too complicated. In recent editions, the most common style is the one mentioned by Strauss’.

Figure 1.19. Notation of harmonics.

For the performer, there are a few possible difficulties on the execution of harmonics: the most important are intonation, finger pressure, finger position, and bowing. Because harmonics happen in mathematical divisions of the string, their tuning does not match equal temperament, except, of course, on octaves. Most audible harmonics on the violin are close enough to sound acceptable; however some adjustment is necessary in harmonics on intervals of third. Natural harmonics of thirds and sixths might not be at the exact same point where the player is used to playing the stopped note. For example, when attempting a natural minor third harmonic on the G string, the player has to place their finger on a slightly sharper note than B flat. Other variations might happen according to construction of the instrument, as well as age and material of the strings. Another issue related to intonation is unique to artificial harmonics: the player has to know the position of two stops. If one of them is out of tune, the harmonic will not speak; if both are out of tune, the harmonic will speak but be out of tune.

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Problems of finger pressure and positioning can be very challenging for inexperienced players for they deal with fine coordination movements. Differences in finger pressure will influence the sound even in regular stopped playing; artificial harmonics add variables to that, particularly when harmonics are paired with stopped notes. In regards to finger positioning, flattened fingers make artificial harmonics speak better because they provide the right amount of surface contact and pressure. However, flattening the finger is not always possible on major and minor thirds. Reaching the fourth finger for sixth can also be an issue depending on the size of the musician’s hand.

Besides the left hand issues, making a harmonic speak requires a bow stroke slightly different than normal playing. In most cases, harmonics require faster bow speed and a little more “bite” than stopped notes. As a general rule, harmonics are played closer to the bridge than stopped notes. Another issue with bow placement can arise if the player encounters another harmonic node with the bow: Young’s law is a physics phenomenon in which the sound of a node is cancelled out by pressing another node along the same string. In this case, neither harmonic will speak.46 This phenomenon happens more often when playing harmonics in higher positions, when the minor and major third nodes are on the general area of sounding bow, between the bridge and the end of the fingerboard. Taking all of this into consideration, finding the perfect contact point, amount of pressure, and bow speed is often problematic even for advanced players.

Harmonics are also often mixed with other techniques in contemporary music. Perhaps the combination that results in the most issues to the left hand is where trills and tremolo involve harmonics, where problems of finger placement and pressure are complicated by the rapid switch

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between fingers. Subharmonics and other bow pressure effects resulting in harmonic sounds will be discussed in chapter 3.
Chapter 2: Exercises for the Left Hand

Left hand patterns: extensions and contractions

In order to master extensions, a violinist needs to have a flexible left hand. Finger stretching exercises should work as finger gymnastics, building flexibility of the hand overtime. The next few exercises are inspired by Carl Flesch *Urstudien*’s for stretches, exercise IB. Like in Flesch’s method, my study asks the player to hold down three fingers while moving another with glissandi. Contrary to Flesch, I prefer to start in higher positions and progressively shift down, for I find that more ergonomic for the hand. Each exercise ends with the stopped notes, with the objective of allowing the player to check their intonation musically. These exercises can be done in any string and key, following the flats or sharps of a scale, or in any left hand pattern.

Figure 2.1. Stretch exercise for the first finger.

Figure 2.2. Stretch exercise for the second finger.
The most challenging part of the exercise is to maintain mobility and flexibility of the joints; in other words, to keep the fingers in place without *holding them down* tensely. From my experience, a good way of having a relaxed hand is to anchor the position either on the ring or middle finger, giving some support to the weaker little finger. The player should not anchor the hand position in the first finger, letting the fingertips fall on the left side, consequently requiring the little finger to stretch out to reach for the strings.

Simon Fischer has several suggestions for stretch exercises, all of which are excellent: first, the exercise can be played without the bow, using the right hand to help keep the fingers in place when necessary. Second, the player should play this exercise very softly, in order to allow for relaxation of the posture. Dynamics can increase when the player is more confident and able to maintain the relaxation of the left hand regardless of the bow movement. Lastly, the player should remove their hand from the fingerboard after playing each line, to avoid straining the muscles.\(^\text{47}\) Above all, no player should spend an extended amount of time practicing stretches. Flesch says in his *Urstudien* that “one cannot repeat too often how extremely dangerous it is not

to heed nature’s warning in continue to practice without resting. It is best to relax the arm frequently.”

Perhaps the most common extension in all violin literature is in the interval of ninths, or unison; an extension of a whole step from the octave frame. Fingered octaves, for example, consist on intervals of ninth. Playing melodic ninths, however, can be challenging from the point of view of aural skills; the player needs to be able to sing and aurally hear the pitch in order to mentally measure the extension. Eugene Ysayé wrote ten preludes, one for each interval; below are a few measures of exercise n. 29, on intervals of ninth:

![Figure 2.5. Eugene Ysayé 10 Preludes Op. 35, Exercise 29, m. 1 to 4.](image)

Extensions of ninth and unison can also be played as double stops without much difficulty for most hand sizes. Exercise number 1, in unisons, involves a few more complicated stretches because of some of the trills (figure 2.6). The trills should be practiced rhythmically at first, as in the variations for Kreutzer Study n. 17, while fingering (but not bowing) the double stop. This way, the player can get used to the approximate angle of the hand. After the trills can be executed without much tension in the left hand, the player should try to bow both strings at the same time. Keeping the third finger down on the string, in support of the little finger, might help in avoiding excessive tension of the right hand.

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48 Carl Flesch, Urstudien (Basic Studies) for Violin (New York: Carl Fischer, 1911), 13.
49 © With kind authorization of Schott Music GmbH & Co. KG.
50 From 42 Studies or Caprices, by Rodolphe Kreutzer (multiple editions).
Figure 2.6. Eugene Ysayë 10 Preludes Op. 35, Exercise 1, m. 1 to 4.\textsuperscript{51}

Otakar Ševčík created an approach to intonation study called “Interval Analysis”, described by Milton Cherry in his dissertation\textsuperscript{52}. When studying a melody, each interval change is repeated a few times, like a tremolo. The intention is to drill the correct finger-dropping movement into muscular memory. In certain passages, extra notes can be stopped to help keeping a good angle or “anchoring” of the hand. This is extremely useful for double stops, since it allows the player to listen to each pitch individually. This method can also be used for the shifts between intervals.

Contractions can be confusing for the brain in similar ways as extensions, for they alter the positions upon which a violinist has grounded their technique. Contractions have an additional difficulty: the adjustment of the fingers. The space between half-steps diminished as the scale goes up the fingerboard. After a certain position, the player is no longer able to leave all fingers down the fingerboard, needing instead to lift or move one finger in order to play the next note in tune. The exact point of this change in technique varies from player to player, according to the player’s hand size. The movement of lifting or moving the finger for a substitution is similar to shifting technique, in which the “new” finger gently pushes the “old” finger out. Mechanically, this explanation sounds odd, as this happens essentially at the same time the “old”

finger is lifted; however, having a leader finger makes the movement more relaxed. The following exercise intends to be an easy introduction to this technique.

![Figure 2.7. Chromatic contractions scale, ascending.](image)

As with the stretch exercises, these contraction exercises can be done in any string, and can go as high on the fingerboard as the player wants. It might be useful for a beginner to play with a drone note (an adjacent open string, or an audio file) or with a partner playing the same notes on the piano, in order to not lose tonal center.

![Figure 2.8. Chromatic contractions scale, descending.](image)

Resources: stretches and extension training

What motivates the discussion of left hand fingerings is the matter of the unusual melodies used by modern and contemporary composers. The large amount of possible variation in scales, series, and melodies makes it impractical to create a modern scale guide. However, the young player should have experience with these issues if a successful career as a professional musician is desired. The following resources deal specifically with the topic of extended left hand frame.
Otakar Ševčík - *Violin School for Beginners*, Op. 6, Part 5, Exercise 11. This section deals exclusively with fourth finger extensions not larger than a whole step.

Kenneth Lee Sarch - “The 20th Century Violin: A Treatise on Contemporary Violin Technique”, DMA Dissertation from Boston University, published in 1982. Sarch provides a scale and arpeggio program organized by interval, including the whole tone scale, the octatonic scale, and arpeggios in all larger intervals. The program consist of thirteen short exercises, one or two lines long each. They begin with half steps only, progressively widening and mixing different intervals.

Francesco Galeazzi - *Teoretico practici di musica*. The method includes extension fingerings and examples of fingerings for large leaps.53

Demetrios C. Dounis - Exercises for the Highest Development of the Muscles of the Hand and Fingers, from *The Artist’s Technique of Violin Playing*. Exercises develop stretch and independence of each finger of the left hand.

Resources: double and multiple stops including extensions and contractions

Kenneth Lee Sarch - “The 20th Century Violin: A Treatise on Contemporary Violin Technique” (DMA Diss., Boston University, 1982). Sarch composes five short etudes in “pairing” double stops, alternating between what he calls “normal” and “reverse” hand patterns -

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normal meaning that the low fingers are on the lower string and higher finger on higher string, and reverse being the other way around. Multiple fingering suggestions are provided.

Paul Zukofsky - *All-interval Scale Book: Including a Chart of Harmonics for the Violin.*

Zukofsky’s scale book approaches every interval thoroughly. The double stop exercises are presented in all keys, major and harmonic minor, as well as the whole tone scale and chromatic scale, in enharmonic notation. No fingerings are provided.

Allen and Patricia Strange - *The Contemporary Violin: Extended Performance Techniques.* Pages 84 and 85 have a chart of all possible double stops, directed at composers.

Resources: modern scales

Luciano Berio - 34 duets for two violins. Similar to Béla Bartók violin duets, Berio’s duets get progressively difficult. The first few studies, presented in enlarged print, can be played by beginners. Some duets have extended notation and techniques.

*The G. Schirmer Violin Anthology: 24 Works from the 20th and 21st Centuries, a Variety of Approachable Music for the Advanced Player* (New York: G. Schirmer Inc, 1945). Pieces arranged for violin and piano, with context notes about each piece and composer on the score. The pieces are challenging but accessible for an intermediate player.
Eugène Ysaÿe - *10 preludes*, Op. 35. Each Prelude is composed around one interval, from unison to tenth. The Schott Frères edition has explanations for each prelude written by the author, from the original manuscript.


Adia Ghertzovici - *Hypostasis: 12 studies in modern violin virtuosity*. The twelve studies are particularly demanding for the left hand. Finger twisting sections and large leaps makes it fun for the very dexterous left hand. There is some extended notation.

“Creeping” fingers or retarded shifting

Traditional technique addresses regular shifting technique quite thoroughly. Retarded shifting, a technique related both to extensions and shifting, however, is seldom highlighted in instructional methods. To execute this technique proficiently, the player needs to be able to
measure extensions accurately, and possess a left hand relaxed enough to slowly slide into the next position. The second issue, more related to shifting technique, is the hardest part, in my experience; the left hand thumb tends to stay in one position and suddenly “jerk” back when the stretch is already too large.

Measures 26 and 27 of the following excerpt, from the first movement of the violin sonata by Claude Debussy, can be played with retarded shift by extending the third finger from the first position F# to the second position Bb, establishing the hand on the second position with the first finger on the G of measure 27.

![Figure 2.9. Claude Debussy Sonata for Violin, 1st movement, m. 23 to 28.](image)

Of course, fingerings are very personal, and other violinists may not choose to use these fingerings. There are pieces in which, however, the retarded shifting technique seems to be intuitive - usually, highly chromatic melodies. A good example is this excerpt from the first movement of the Violin Concerto n. 1, by Dmitri Shostakovich. All passages in triplets have at least one instance in which retarded shifting is adequate.

![Figure 2.10. Dmitri Shostakovich Violin Concerto n. 1, rehearsal 15 to 3 after rehearsal 15.](image)

54 © With kind permission of G. Henle Verlag e.K.
A preferred method by the author for studying creeping fingers is by practicing whole tone and octatonic scales. The fingerings suggested below (figure 2.11, 2.12, 2.13) avoid anchoring the hand in any particular position, requiring the adaptation from stretches into new positions. Whole tone scales “creep up”, while both variations on the octatonic scale (beginning with a half step or with a whole step) “creep down”.

Figure 2.11. Whole tone scale.

Figure 2.12. Octatonic scale beginning with whole step.

Figure 2.13. Octatonic scale beginning with half-step

The scales may be played in any starting note on the G string. Beginning in a different string will require changes in the fingering, and add regular shifts.
Glissando

For the majority of the repertoire, glissando is used for dramatic moments in expressive music; even then, convention dictates it should be used sparingly and executed quickly. The mechanical aspects of this expressive glissando are explained thoroughly by Ivan Galamian and Carl Flesch; both describe three different kinds of glissando. In Galamian’s words, they are the overslide, when the “new” finger is placed on the string right away and then slides to the desired note; the underslide, when the “old” finger slides to the point where the “new” finger can be placed directly on the desired note; and the combined glissando, in which both “old” and “new” fingers slide. The study of glissando in all its forms is beneficial not only for the execution of expressive glissando, but also for better finger independence and relaxation of the hand; it can also be part of a study of shifting.

Flesch and Galamian do not go in detail into yet another kind of glissando, which is the one where the “old” and “new” fingers are the same finger. This slide has no interruptions, and its execution may blur the beginning and end pitches. For a large part of the repertoire, this kind of glissando would be considered distasteful; however, it is exactly what some modern and contemporary composers prescribe. The following excerpt, from the second movement of the Violin Sonata n. 2 by Béla Bartók, has glissandi that can be played with all types of glissando described above without much difficulty. A good challenge would be to study the excerpt purposefully using only one kind of glissando at a time, even when another kind would be more convenient or more expressive.

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When discussing glissandi as an expressive device in modern music, Martin Wulfhorst mentions the necessity of pacing the glissando for it to sound even. However, the word “even” can have multiple interpretations. For a truly even-sounding glissando, the player would have to slide faster on the lower part of the fingerboard, slowing down as distance between notes diminishes. In a fast tempo, this glissando sounds attractive and “sweeping”; slower, the player gets a sound similar to a slide-whistle. The next example, from the first movement of the Violin sonata n. 3 by Alfred Schnittke, is a good exercise through which to consider the concept of “evenness”. The passage consists of several measures with glissandi between notes in varying intervals, from a minor 7th to a minor 2nd. In this case, an even glissando might be an average speed between all notes; or it could also be related to the rhythm, dividing the time between fixed pitch and slide sound evenly. Players may come up with different criteria to define “even glissandi” for this situation, and the challenge would be to play the entire passage using the same criteria for every interval.

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Microtonality

Microtonality is not an everyday occurrence for most violinists; therefore, the utility of mastering a 24-tone scale is debatable. However, experimenting with microtonality can be helpful for the musician’s aural skills, besides preparation for encounters with the technique, because playing microtones can be confusing for both the muscular memory and the ear. The examples included in this chapter intend to facilitate “first encounters”, with relatively non-demanding examples. For the player who develops a deeper interest on the subject, Kenneth Lee Sarch’s dissertation provides several studies for microtones and a discussion on fingering choice.59

The following excerpt is from the first movement of Julian Carrillo’s string quartet 2 Bosquejos para Cuarteto en 4os de Tono. The notation is different than usual, using a dash pointing up or down to indicate that the note is a quarter tone higher or lower (this is explained in the composer’s notes provided to performer). This passage is interesting for study because of its scalar movement, which makes it easier for the ear. The challenge for the player would be to avoid losing aural sense of the chromatic scale, playing the traditional pitches with their actual sound when requested.

58 © With kind permission of Musikverlage Hans Sikorski GmbH & Co. KG., Hamburg.
Figure 2.16. Julian Carrillo 2 _Bosquejos para Cuarteto en 4os de Tono_, Meditación, m. 1 to 3.\(^{60}\)

The next excerpt, from the third movement of the Violin Sonata by Karel Husa, has similar challenges.

Figure 2.17. Karel Husa _Sonata for Violin_, 3rd movement, rehearsal 220 to rehearsal 230.

\(^{60}\) © With kind authorization of Editions Jobert.
The next excerpt, from the piece *L’âme Ouverte* for solo violin, by Giacinto Scelsi, is more challenging both for the player’s ear and left hand. It requires scordatura for the D and G strings, opening the possibility for combination of close microtones in different strings. Even with the scordatura, extensions are necessary. In the score, each line represents one string, indicated before the first note. The instructions ask the musician to pay attention to the number of beats caused by the microtones; numbers above a note represent the number of beats, while a circle represents a perfect interval. The challenge and the richness of the experience lies in “figuring out” how these instructions translate to the ear’s perception - it is quite difficult to describe appropriately with words.

![INSTRUCTIONS](image)

Figure 2.18. Giacinto Scelsi *L’âme Ouverte*, instructions.\(^{61}\)

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\(^{61}\) © With kind authorization of Editions Salabert.
Vibrato

From the 20th century onwards, violinists and pedagogues such as Galamian\(^\text{62}\) and Menuhin\(^\text{63}\) discuss the involvement of arm, wrist, and fingers on the mechanical movement of vibrato as well. To this day, some players and teachers discuss the differences between “finger”, “wrist”, and “arm” vibrato. From my observation, the isolated study of individual vibrato


mechanics seem to be more important for remedial studies, when the student is not satisfied with their tone, than for expressive purposes.

Regular vibrato exercises have been common in violin instructional methods since the 19th century. These exercises intended to develop continuous vibrato, and routinely involve different speeds and widths. Because traditional literature covers the subject of continuous vibrato well enough, it will not be mentioned in this chapter.

For the player who has a solid understanding of the basic vibrato technique, the difficulty of contemporary music consists in translating the score into sound with fidelity and style. Playing the following excerpts could complement traditional vibrato training. The excerpts, from the first movement of *Miniatures*, by Krzysztof Penderecki, require unusual dynamics and tone color changes that complicate the execution of vibrato. While the beginning of the first example feels quite natural, the ending tends to contradict traditional training, which usually associates broad with and fast vibrato with *forte* dynamics, and vice-versa. Penderecki asks the player to increase the width of the vibrato at the same time as a *diminuendo* from *forte* to *pianissimo*. The second example asks the opposite: a *crescendo* with a broad vibrato that becomes narrow as the sound gets louder.

Figure 2.20. Krzysztof Penderecki *Miniatures*, 1st movement, m. 2.
Trills and Tremolo

Since the Baroque era, the notation of trills and tremolo have changed very little, and their mechanics still remain essentially the same as in the old ornamentation treatises. However, contemporary composers expect the player to be able to use more variation in dynamics and tone color, as well as possess an enhanced endurance to play continuously without decay in intensity.

The following excerpt, from the piece *Reveille* by Benjamin Britten, is part of a section consisting entirely of trills (beginning on the *pianissimo* on the middle of the first line). The challenges of this excerpt are related to intonation and relaxation of the hand. Because the entire passage is on one string, there are constant shifts; the beginner student will have to practice the passage without trills first. Next, the player needs to pay attention to the tuning of the whole step trills even in chromatic passages. It will be useful to practice the trills with rhythmic variation.
The same instructions apply to tremolo study: when a passage has constant shifts, as passages fully in tremolo or trills usually do, intonation can be a problem even before the issues with endurance of the left hand. The next excerpt, from *Mythes: I. La Fontaine d’Arethuse*, Op. 30, by Karol Szymanowski, has significant novel challenges due to the fact it is in double stops. Holding down double stops tires the hand faster than single notes, and needs more conscious relaxation of the whole arm. If a player tends to get tense in difficult passages, they should stop after every measure and leave the fingerboard for a few seconds before continuing. Holding the violin scroll against the wall (wrapped on a soft piece of fabric for protection) can also help relaxing the left arm.

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64 © With kind authorization of Faber Music Ltd.
Harmonics

The possibility of writing entire sections of music only with harmonics has been known for a long time: in 1761, L’Abeé le Fils wrote a minuet only with natural and artificial harmonics; his method of violin playing included pieces with trills in harmonics. However, the practice only became common much later, due to their consistent use for expressive purposes by composers from the Romantic era and beyond. Nowadays, most violinists know the natural harmonics of octaves and fifths and are able to play artificial harmonics in the interval of fourth without much issue. Unfortunately, however, the most common repertoire and instructional books do not include harmonics in thirds, fifths, or sixths; natural harmonics of intervals smaller than the fifth are much less common as well.

The next couple of examples deal with issues of finger pressure. The first excerpt, from the Violin Sonata by Karel Husa, alternates harmonic finger pressure with stopped note finger pressure. I suggest playing the first two measures as one continuous glissando, in harmonics in
the first measure, until the middle of the string (around the G one octave above the open string), switching to stopped notes from that point on. The third measure, the harmonic becomes a stopped note progressively. The mere execution of the excerpt should not be too hard; the challenge is in making this changes expressive and artistically “convincing”.

Figure 2.24. Karel Husa Sonata for Violin, 2nd movement, m. 12 to 14.

Another issue with finger pressure happens when composers demand harmonics to be played in double stops with a stopped note. This is confusing for the player’s muscular memory, and particularly for the bow; because of the differences in vibration between stopped notes and harmonics, it is hard to make both notes speak and sound equally. The next excerpt, from Arnold Schoenberg’s Phantasy, includes several instances of double stops with harmonics and stopped notes, up to a third position.

Figure 2.25. Arnold Schoenberg Phantasy, m. 19 to 21.67

The last issue with harmonics is the sheer lack of knowledge of the possible pitches and how to achieve them in the fingerboard. According to Paul Zukofsky, “No area of violin

67 Copyright © 1978 by Heinmar Press, Inc. Used by permission of C. F. Peters Corporation.
technique is so misserved by classical training as that of harmonics.” His argument is that, because the training in harmonics is limited, most violinists know only a few possibilities for each note. The first step to gain more knowledge would be to apply the principles of scale books in artificial harmonics in intervals of fourth to artificial harmonics in other intervals. The next step would be practicing with harmonic charts. One way of doing this, for natural harmonics, would be to play the harmonics according to their interval in relation to the fundamental, from the lowest to highest, and vice-versa. Paul Zukofsky’s chart, listed below, can be read vertically (as in, playing all possibilities of the same note at once), horizontally (playing all possible notes for a certain finger position) or diagonally (in a scale). The important thing is to organize the practice of harmonic charts so it is meaningful for the player, in order to facilitate some degree of memorization.

Resources: harmonics charts

Paul Zukofsky - *All-interval Scale Book: Including a Chart of Harmonics for the Violin.*

Zukofsky’s book includes undoubtedly the clearest chart of harmonics for the violin. It is organized by pitch, presenting all options available to arrive to that pitch through natural harmonics and artificial harmonics in third, fourth, fifth and sixth.

Kenneth Lee Sarch - “The 20th Century Violin: A Treatise on Contemporary Violin Technique.” The dissertation has a brief chart of natural harmonics where the resulting notes and fraction nodes are displayed for each string.

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Henry Polansky - *New instrumentation and Orchestration.*\(^7\) Polansky’s book has a chart of the natural harmonic nodes of the G string, which can be transposed to the other strings. Harmonics are organized graphically: a horizontal line represent approximate position of the nodes along the length of the string, and vertical space organizes the resulting pitches according to interval relation to the fundamental.

\(^7\) Cited by Strange and Strange in *The Contemporary Violin: Extended Performance Techniques*, 116.
Chapter 3: Right Hand

The right hand is responsible for most of what is expressive about the sound of the violin. The variety of colors the right hand can produce is much wider than the left hand, a result of the many possible combinations between a multitude of variables - for example, speed and force of each movement; different usable parts of the bow (or fingers for pizzicato); and different parts of the string (or even the instrument) that can be plucked or bowed. As with the left hand, the demands of contemporary music for the right hand are similar as for older music, but with additional requirements. In what relates to traditional technique, the new demands can be summarized by a need for mastery of the extremes and quick shifts between different sounds.

It is safe to say that the modern bow has existed in its present form for over 200 years. All bowing techniques considered standard were established by the end of the 19th century: the articulation techniques of spiccato (off the string), the ricochet, the staccato (short notes on the same bow direction), the martelé, collé, and all the variations on legato; as well as simple color changes like sul ponticello, sul tasto, pizzicato, and col legno. This paper will not discuss articulations, for there is enough traditional material on the subject already; it will discuss dynamics and color changes, including sul tasto, or flautando, and sul ponticello, as well as effects related to bow pressure, tremolo, pizzicato, and col legno, because of their prominence in 20th century compositions for violin.

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71 Other bows were created after the Tourte bow - the “Bach bow”, described by Arnold Schering, probably being the most documented recent development. Several models of baroque and classical bows of modern making are also common nowadays, but they are used for very specific ends. The subject of instruments and equipment outside the traditional classical Western violin is removed from the original objective of this paper; therefore, they will not be discussed. David D. Boyden, "The Violin and Its Technique in the 18th Century," 14-16.
Changing dynamics

Dynamics markings, in music, represent the intensity of sound volume of a note. For all string instruments, the control of dynamic changes depends on three factors: speed, pressure, and contact point of the bow with the string. The violinist needs to have control over several nuances of the fine coordination of the right arm; among them, the position of the fingers on the bow, adequate elbow height, and adequate engagement of joints and muscles. Most dynamic and tone color changes come from combining one or more factors.

In the Western classical tradition, violinists are expected to master dynamic changes (soft and loud) and nuances (crescendo, decrescendo). However, with some exceptions such as hairpins, dynamic markings are ambiguous - their symbols do not correlate immediately with decibel levels the way note head placement relates to specific pitches. Dynamics markings also do not always specify the kind of attack and ending of a note, nor the direction of a phrase. Besides control of coordinated movements of the right hand, the competent adjustment of dynamic depends on the player’s ability to read their context: the softest pianissimo a player can execute will not be adequate for a solo violin piece played in a large concert hall, but is exactly what the player needs in a large opera orchestra, for example. For that reason, the interpretation of dynamics is often left to the intuition of the performer.

This work in and of itself is challenging; in contemporary music, however, dynamics and tone colors may alternate fast and in extreme ranges, making it even harder. In particular, music written by Stockhausen, Boulez, Carter, and others who subscribe to total serialism, pointillism, or complexity, often present a separate dynamic marking for every note. In some cases, their dynamic markings can indicate any of twelve levels of dynamic - from ffff to ppppp - that are
serialized just like the twelve tones of the chromatic scale. This method does not aim for continuity and phrasing; the notes should be played according to their “face value”. In his book *Aspects of Music Notation*, Hugo Cole says this type of marking is “more revolutionary than it looks”; his argument is that good execution requires conscious denial of years of training for perfectly even phrasing, and an effort to not connect each note to the previous and the next in a rhetorical way.\(^{72}\)

Traditionally trained performers might feel uneasy with such rigid notation; if not using an electronic device, a performer will mostly get approximations. However, looking for the best approximation can be on itself a learning experience, and help control more subtle changes and broaden the technical possibilities. Most exercises on dynamics in chapter 4 intend to develop a “fixed” system of dynamic levels. This study would allow the player to be better equipped in case they encounter music in those styles, but should also help with developing an overall broader range of dynamics.

Another aspect of dynamic change are attack variations. The word Pierre Baillot used to describe accents in his method is *saccade*, which means “jerk” in a literal translation from the French. Baillot says the player should avoid the harshness natural to this bow stroke with quick movements of the bow.\(^{73}\) Galamian adds that there are three different kinds of attack: the smooth, vowel-like beginning, the consonant-like attack, and the accent. The differences between them depend mostly on pressure and speed: the smoothest attack is slow and without pressure; the clearly defined consonant-like attack is fast with not too much pressure; and the accented attack involves both speed and pressure, sometimes applied before the stroke,

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depending on the desired effect. Accents also have the influence of the left hand; in some styles of music, it is more appropriate to produce an accent through the use of vibrato instead of bow movement.

Traditional notation of dynamics remains essentially the same since the Romantic era; the logic behind it, of using the first letter of the Italian words piano and forte for soft and loud sounds, and the prefix mezzo- for the sounds in between, has been in use for centuries. The use of the words crescendo, decrescendo, and diminuendo, as well as the use of hairpins in their substitution, is also standard when indicating dynamic changes.

\[
\text{pppppp ppppp ppp p m p m f f f f f f f f f f f f f f f f}
\]

Figure 3.1. Dynamic markings.

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\[\text{Crescendo} \quad \text{Decrescendo} \quad \text{Diminuendo}\]

Figure 3.2 Crescendo, decrescendo or diminuendo, and respective hairpin symbols.

To this day, these are symbols used by the vast majority of composers to indicate dynamic markings. Other symbols invented more recently tend to be used by individual composers, and their interpretation is specified in the score. One kind of dynamic symbol that is seen with certain frequency is the al niente notation, a circle at the end of hairpins, indicating “to nothing” (figure 3.3). Another notation style less common in violin music, but still relatively common in contemporary music, are variations in note size to indicate dynamics.

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Changing tone color

The word *tone*, in violin music, usually refers to the quality of the sound produced with the bow. Pierre Baillot describes tone as “breadth of playing”, referring to the length of each stroke, the amount of space between strokes, and where and how each stroke begins and ends. Good tone production - usually described as “big”, resonant sound - depends on a good balance of the mechanisms of the right hand. Carl Flesch lists the skills necessary for good tone production as follows: first, correct and consistent angle between bow and strings; second, an amount of inclination adequate to the tension of the bow; third, fluidity in bow changes; and last, adequate amounts of bow pressure.

Besides the pure tone quality, violinists of the Western classical tradition are expected to be able to execute a certain number of different “voice qualities” - for example, *marcato*, “airy” and “heavy” sounds, among others. A violinist educated in the 19th century tradition is familiar with the sound changes between different repertoires: a good musician will not play an Italian opera and a Brahms symphony with the same sound. Most violinists can also agree on the differences between a “romantic” and an “historically informed” interpretation of J. S. Bach, for example. Tone color is the term that best describes the detailed nuances of these differences.

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Even though the left hand (particularly vibrato) plays an important role in defining tone\textsuperscript{77}, it is arguable that the right hand does most of the work.

As with dynamics, the elements of tone production are speed, pressure, and contact point of the bow with the string. Contemporary composers have found new places to place the bow, besides the strings; however, even within the realm of regular string bowing, there are a number of possible nuances of tone production. If we define regular pressure and middle contact point as the ideal conditions to produce a pure, mezzo-forte tone, we can describe the tone produced further from the bridge and by less pressure as progressively more “sandy”, and the tone of excess pressure made closer to the bridge as progressively more “brittle”. Excess speed can produce accents; excess pressure can also produce different percussive effects and even notes, as will be discussed in the section on variations on bow pressure. Kenneth L. Sarch explains the harmonic aspects of contact point changes as follows: when the bow is moved towards the bridge, generally, the sound produced has increased sound wave disturbances (noise), producing a more piercing and “dirty” timbre. Towards the fingerboard, there are more high overtones, producing an airy, superficial sonority. In both cases, the further the bow is from the ideal cantabile point of contact, the more the overtones are audible over the fundamental pitch.\textsuperscript{78}

Besides the subtle color changes on “regular” melodies, all techniques described in the following sections are “extremes” of tone color possibilities. The awareness of the different sound colors is still important even if the player does not develop an interest for contemporary

\textsuperscript{77} Fingering choice is also influential in tone production. Several important pedagogues, such as Baillot, Galamian, Flesch, described the different character of each string. Carl Flesch, in his book on fingering issues, concludes that fingerings that stay in the same strings as often as it is practical tend to have a more uniform and fluid tone color than fingerings that switch between strings constantly. Flesch goes so far as to say that each finger brings a different timbre to the same note in the same string, because of differences in surface contact. Carl Flesch, \textit{Violin Fingering: Its Theory and Practice}, 280.

music in particular; orchestral players are constantly asked to change dynamics, nuances, and timbre to fit the conductor’s idea.

Flautando or sul tasto

Flautando, or flautato, is a technique that asks the performer to play with an “airy”, somewhat feathery sound, imitating the tone of a flute. Because the most efficient way of getting that result is by playing near the fingerboard, the term is often used interchangeably with sul tasto or sulla tastiera, which mean simply to play over the end of the fingerboard. A similar technique can also be used for sotto voce indications, and for orchestral pianissimos.\(^{79}\) Regardless of the nomenclature, the terms describe a transparent sound, rich in high harmonics. This sound is most easily achieved by playing near or on the fingerboard, with fast bow strokes and very light pressure. There is no notation besides written description or explanation in the score.

Sul ponticello

Sul ponticello is the term used to describe playing the bow near the bridge. The nomenclature sul ponticello, literally translated, means on the bridge; but that is not how players usually interpret it. Perhaps for the sake of accuracy, some composers write terms like poco sul ponticello, or quasi ponticello, but many simply write ponticello and expect the performer to

\(^{79}\) Boyden, “The Violin and its Technique in the 18th Century,” 28.
interpret it in a way that makes sense to the music. This is relevant because, as Kenneth Lee Sarch points out in his dissertation, minute differences on bow placements will change how clearly the fundamental pitch is heard, and how brittle the timbre will sound.\textsuperscript{80} The sound characteristic of this technique is noisy with harmonics and more strident than the sound from other contact points; the string can sound “distorted,” like an electric guitar, depending on the amount of pressure used by the player. Since tiny variations on pressure and contact point will produce noticeable differences in the sound, it is necessary that players have absolute control over the trajectory of the bow. Sul ponticello has no notation symbol beyond the written indication on the score. Alternatively, composers write \textit{modo ordinario} when sul ponticello or sul tasto are not desired anymore.

Tremolo

Right hand tremolo resembles left hand tremolo, in the way both techniques involve a short repeated pattern. In right hand tremolo, the bow “shakes”, faster or slower depending on the indication of the score. Tremolo can be measured or unmeasured. In most cases, the player can imply whether tremolo is measured or unmeasured comparing the notation to the tempo of the piece. Two dashes, indicating 16\textsuperscript{th} notes, are enough indication of unmeasured tremolo in a fast piece; if the same indication is in an \textit{adagio}, the players might play regular note divisions.\textsuperscript{81}

\textsuperscript{81} Berlioz, \textit{Treatise on Instrumentation}, 12.
Composers have used this effect for centuries as a means for building tension. According to Hector Berlioz, in his *Treatise on Instrumentation*, bow tremolo “expresses unrest, excitement, terror.”\(^{82}\) Besides the tone color effect, bow tremolo can add volume - since each note can be played with more speed - and noise - because bow changes tend to come with a slight “bite” sound caused by the friction and rosin on the bow. In contemporary music, sometimes tremolo is a feature on its own; for example, Luciano Berio’s *Sequenza IV* for solo viola, which asks for nearly constant tremolo across several strings, was described by the author as “an etude in endurance, strength and intensity.”\(^{83}\)

The mechanical aspects of this technique are quite intuitive; however, it is easy to play tremolo with excessive tension, bringing pain and discomfort. String players tend to overwork their right shoulders and elbows in particular. Roger Benedict, in his article about tremolo technique for *Strad magazine*, lists the most important aspects of good tremolo execution: first, the player needs a good setup and position of the bow and violin hold, so the right arm is not overworked; Benedict suggests tilting the violin down a little when playing on the lower string, so the elbow is not too high. Second, he recommends keeping a bow stroke that consists of strong down-bows and up-bows that “spring back” naturally, as in a fast détaché, instead of trying to play each individual stroke forcefully.\(^{84}\) Keeping the tone even, a common issue in tremolo execution, becomes harder when tremolo is combined with other color changes that involve different contact points with the string and different amounts of pressure.

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\(^{83}\) Cited by Roger Benedict, "Tremolo Technique for Violin and Viola," in *Strad* 122, no. 1450 (February 2011): 76.
\(^{84}\) Benedict, "Tremolo technique for violin and viola," 76-78.
Bow pressure

More often than not, when violinists talk about changing tone color with bow pressure, they are discussing the effects of very light bow pressure. Useful for *pianissimos* and airy timbres, light bow pressure is required by several important styles and pieces of the violin repertoire. The effects of overpressure are much more rarely discussed, even though, according to Strange and Strange, overpressure is one of the most popular extended techniques for the violin, appearing “in a plethora of scores since the mid-1970.”

In most of those scores, composers ask for overpressure for its percussive or noise effects. In these cases, the player should make sure that the execution fits the score’s instructions and character of the piece, focusing on the quality of the timbre. Overpressure can result in several different sounds, depending on speed and contact point. The contact point of the bow on the string will change the timbre because of the differences on flexibility of the string - generally, tones tend to be deeper further away from the bridge, and vice-versa. In regards to bow speed, pitchless noise usually requires very slow strokes. In many cases, muffling the strings with the left hand may be necessary to avoid harmonics or sympathetic vibration of the open strings.

There is no standard notation for each separate timbre of bow pressure noise. In some cases, bow pressure noise will be notated as an x-shaped note head in the score. Graphic notations and other unusual styles are generally explained in writing on the score’s instructions pages.

In other cases, composers will ask for overpressure but still expect a sounding pitch. In this context, it is important that the performer can produce pitch using differing degrees of pressure. A slow bow combined with heavy pressure will produce a timbral texture without pitch; different combinations of pressure and speed will allow for more or less pitch to be heard.

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A composer’s requirements may vary from a “scratchy” tone, where just a bit more pressure than usual, to subharmonics, where a relatively clear pitch is expected. The “pedal tones” employed by George Crumb in *Black Angels*, perhaps the most widely known case of expressive use of overpressure technique, are a good example that falls between the extremes of subharmonics and noise.

Subharmonics, also known as undertones or Anomalous Low Frequencies (ALFs), are tones below the natural note of the open string, produced by consistent overpressure. The differences in nomenclatures for subharmonics are more related to scientific research on the nature of the acoustic phenomena than to the performance practices. Violinist and composer Mari Kimura, leading violinist and composer of music using subharmonics, says that defining musical matters with scientific terms is of little use to the performer, and defends the use of the term subharmonics interchangeably. The execution of this technique is quite delicate; it requires correct placement of fingerings of the left hand and correct contact point of the bow with the string (generally close or on the fingerboard). Minimal changes to either of these aspects or others (such as amount of rosin in the bow and bow tension) will change the method of achieving the desired sound. Kimura also affirms that the age of the string is quite influential on the performance of subharmonics; older strings are better. There is no standard notation for subharmonics.

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Pizzicato

Pizzicato, or plucking the string with the right hand, is a standard technique for violin players of all levels. Many beginner methods rely heavily in plucking; pizzicato is also common in orchestral and chamber repertoire of all levels. Perhaps for that reason, most violinists do not give it much thought; they simply use their index finger in whatever manner that produces sound. However, pizzicato is almost as rich as the bow in regards to variety of possible tone colors. Hector Berlioz, in his treatise on instrumentation, expresses his concern with this issue, adding that he wishes violinists would be willing to use their right hand like the guitar player, allowing faster passages and repeated notes to be playable with brilliance.89

Later, composers started to notice and take advantage of the different sound colors of pizzicato. The variety of demands of the 20th century is enormous, as concisely described by David Boyden:

Pizzicato techniques demanded by composers in the 20th century included the prescription of various pizzicato locations (e.g. mid-point of the string, at or behind the bridge, or either side of the stopping finger) or specific plucking agents (e.g. with the nail or the fleshy pad of the finger), requiring strings to be stopped with the fingernail for pizzicato, perpendicular strumming and oblique strumming of chords, or specifying pizzicato with alternating fingers (e.g. Crumb, Four Nocturnes). A ‘scooping’ technique was developed to obtain mellow, resonant pizzicatos in single and double stopping. Other effects involved ‘flicking’ the string with the nail, pizzicato glissando using the finger or peg (Crumb), pizzicato tremolo (Bartók), ‘snap’ pizzicatos (introduced by Biber but popularized by Bartók), pizzicato natural harmonics (Crumb) and pizzicato with vibrato in varying degrees.90

The utility of becoming proficient at all of those techniques as a young violinist might be arguable; however, an increased dexterity on the fingers of the right hand is necessary even for

89 Berlioz, Treatise on Instrumentation, 35.
the execution of certain pieces of the Romantic repertoire. Adrian Eales mentions that “speed in excess of 232 notes per minute and a large dynamic range are common requirements” of pizzicato in orchestral music.91

The most common variations in pizzicato playing involve differences in the nature of the movement of the right arm. Pizzicato can also be played gripping the bow or in arco position, extending the index finger; the first way allows for faster alternation between pizzicato and arco, while the second way allows for more freedom of movement. Pizzicato can be played from a fixed position, with the bow arm resting near the body of the violin or the thumb resting on the fingerboard, starting “from the air” above the strings. The first grants more control; the second, more projection of sound.

The exact location where a string is plucked also matters. On the string, different locations mean different tension and resistance levels; therefore, longer or shorter vibration time, with more or less projection, and a rounder or sharper sound. Plucking the string above the fingerboard results in a rounder, more resonant sound; plucking near the end of the fingerboard gives a sharper attack; and plucking near the bridge results in a noisier sound. Plucking beyond the middle of the string into the fingerboard usually results in a feeble, vowel-like sound; on the other hand, ponticello pizzicato sounds very strident. The location of the pluck also influences the amount of time the note will resonate. In general, notes will be shorter if plucked closest to the extreme ends of the string, where it is more tense, and longer near the middle of the string, where it vibrates more freely. Other possible considerations that may change tone colors of the pizzicato are the specific direction of the pull, which finger is used, and which part of the finger is used. The common pizzicato does not have a special notation besides the verbal indication pizz., placed near the note on the score.

91 Eales, “Fundamentals of Violin Playing and Teaching,” 118.
Besides the traditional pizzicato - where the player pulls the string with the index finger, at an angle slightly to their right side - most intermediate players know other conventional forms of pizzicato. One of them is the touch pizzicato, when the string is not plucked, but rather pressed down and then released; this is probably the safest way of achieving a pianissimo pizzicato, and it is very common in orchestral and chamber music. Another common variation of pizzicato is the snap pizzicato, or Bartók pizzicato, which pulls the string upwards with the thumb and index fingers. When released, the string hits the fingerboard, producing a snapping sound. The first use of snap pizzicato happened way before the 20th century, in Heinrich Biber’s piece Battalia, representing a gunshot; however, it was popularized by its use by composer Béla Bartók in his string quartets.92

![Figure 3.5. Notation of the Bartók pizzicato.](image)

The next most common variation of pizzicato technique might be strummed or arpeggiated pizzicato chords. Arpeggiated chords may be written out in a rhythm or indicated by a wavy vertical line. Strummed chords, where the notes are supposed to be played all at the same time, often have arrows indicating in which direction the finger is supposed to move. Neither of these techniques has a standard way of execution. The most common way is to sweep the index finger through the strings, faster for strummed chords and slower, or in a more controlled manner, for arpeggios. Not surprisingly, this technique is acquired only by some performers.

92 Stowell, “Technique and Performing Practice,” 132.
Less conventional techniques include the buzz pizzicato, executed by stopping the right hand’s fingernail lightly on the plucked string, creating a buzzing sound; the similar tambor pizzicato, common among tango violinists, where the player rests his left hand between the D and G strings, making the G string buzz like a snare drum when plucked. The nail of the left hand finger touches the G string from the side (fleshy part of the finger on the D string) producing a drum-like percussive sound when plucked; and the tremolo pizzicato, also known as banjo pizzicato, executed by plucking the same string with several fingers consecutively.
Col legno battuto and col legno tratto

The term Col legno, directly translated from the Italian, means “with the wood”. In string music, it refers to music played with the stick of the bow instead of the hair. There are two kinds of col legno. Col legno battuto, used since Berlioz, is the most common, and consists in vertical movements, as in ricochet bow strokes, made with the stick of the bow. The intended sound is percussive, and the pitch will be more or less clear depending on how vertical the bow movement is and how much bow hair the performer allows to touch the string. Col Legno tratto requests the performer to play horizontally, as in legato bow strokes, using the bow stick instead of the hair, creating a “ghostly” sound. Col legno tratto is used less often than col legno battuto, perhaps because its effect is so subtle; according to Strange and Strange, col legno tratto also tends to have an inconsistent sound, which might explain its relative unpopularity. Col legno tratto can be combined with other techniques intended for subtle noise effects, such as circular bow or effleuré fingerings. Both col legno techniques can be applied to any part of the instrument, for different timbral and theatrical effects. Both col legno techniques also involve a slightly different bow hold; the bow needs to be inclined enough that most of the hair is not touching the string - contrary to what violinists are trained to do. The technique itself is not difficult to execute, when in isolation; problems may arise when col legno alternates with regular bowing at a faster speed than the player is accustomed. This alternation requires agility and flexibility of the fingers; the necessary movements are similar to the movements needed to alternate between certain articulation markings and variations on tone color.

Violinists are often not fond of col legno; depending on how much force is used to play the col legno passage, dents or scratches on the (often expensive) bow wood may happen.

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Kenneth Lee Sarch, in his dissertation, recommends using an inexpensive commercial bow for pieces that require much of this technique; he also recommends wrapping the stick with tape can protect it from nicks on col legno battuto, but will not work if the piece asks for col legno tratto.\(^94\) One can wonder, however, if wrapping the stick with tape would not be even worse for the protection of the delicate varnish of an expensive bow than the potential damage of the col legno techniques themselves.

Chapter 4: Exercises for the Right Hand

Changing dynamics

Most violin methods introduce dynamic changes as basic contrast between forte and piano. As the student acquires more control over their technique and cultivate their musical perception, more nuance can be introduced, including thinking about how to produce these differences. As mentioned in the previous chapter, mastery of dynamic changes depends on control of the three aspects of tone production: bow pressure, bow speed, and contact point of the bow with the string. It is not uncommon for intermediate students to have weaknesses in at least one of these areas. The exercises in this section might not be appropriate for students who need serious remedial work in their right hand technique. However, they should help intermediate students who already have a relatively consistent control of their tone production to further refine their skills.

Developing proficiency with dynamic changes requires an understanding of the physical phenomena of their production - louder dynamics happen when the player applies pressure or speed, or plays where the string is more tense; and softer dynamics happen when the player removes pressure or speed, or plays where the string is more flexible. Carl Flesch recommends that the “base” dynamic - the sound played without effort to make it louder or softer - be considered as mezzo forte. Even though this recommendation is arbitrary, it is practical, since there is no truly “medium” dynamic, and most technique methods aim for a “big” sound as the

95 Flesch, Problems of Tone Production in Violin Playing (New York: Carl Fischer, 1934), 16.
ideal regular sound. The following exercises depend on the student being able to understand this concept and hopefully identify their own *mezzo forte*.

The simplest exercise to develop an awareness of individual aspects of tone production is the study of *crescendo* and *diminuendo*. Any scale or open string can be played following the dynamics on figure 4.1. Students should try to play using speed, pressure or contact point variations alone; then, combinations of bow pressure with bow speed, bow pressure with contact point, and bow speed with contact point. Isolating each aspect of tone production consistently and without relapse is very difficult, if not impossible, for all sounds are made with the same system; however, some proficiency with such a system can help the player’s variation of tone color as well as dynamics. Above all, the experiment intends to strengthen the player’s perception and self-awareness.

![Figure 4.1. Basic crescendo and diminuendo studies.](image)

As the exercise becomes easier, the student can try playing fewer notes or fewer bow changes between each dynamic marking.

The following excerpt, from the piece *Distance de Fée* by Toru Takemitsu, has relatively fast *crescendos* and *diminuendos*. One study suggestion is to print the excerpt in landscape position, enlarged, and add the dynamic markings “in between” Takemitsu’s indications.
After the basic dynamics and aspects of sound production are understood, the student can experiment with more extreme dynamics - which can hardly be produced without combining variations of speed, pressure and contact point. The following exercises are a crescendo and a diminuendo to the extreme volumes of ppppp and fffff, intended to be played without rigid limitations of the use of pressure, speed, or contact point variations. Here, the player should attempt to execute the dynamics in a neutral, resonant tone, with as little color variation as possible, using whatever combination of pressure, speed and contact point variations is more natural and effective for their setup.
The following excerpt, from Milton Babbitt’s piece *Sextets*, is an example of extreme dynamic variations in the repertoire. Students can attempt to play with as much contrast as possible with a pure tone, and then experiment with more extreme but perhaps not so clean dynamic effects as well.

It is debatable whether the sounds produced by a *ppppp* and a *fffff* are actually applicable, or desirable, for real performance. An absolute scale of 12 dynamic differences might translate into gritty or sandy sounds, with as much noise as pitch, on each extreme. Also, certain bow strokes, such as *spicatto*, might not yield the same extreme changes as *legato* or *detaché*. However, experimenting with different techniques and fine-tuning the ear to more subtle nuances is an important part of the development of an artist. When talking about *piano* dynamics, Martin Wulfhorst asks the question: “how soft can you play without getting ’grit’ or ‘sand’ in your

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Figure 4.5. Twelve possible dynamics.

Figure 4.6. Milton Babbitt, *Sextets* for Violin and Piano, m. 67 to 71.

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One could add, how loud can you play without scratching? The best players will have a very broad range between both extremes.

Changing tone color

Tone color is very closely related to dynamics, because the means of producing both are the same: control of speed, pressure, and contact point of the bow with the string. The exercise proposed for Figure 4.1, if practiced regularly over a period of time and with keen attention, can help players learn a wide range of color variations.

One interesting aspect of this process is what Ivan Galamian calls the two main styles of tone production. The first style uses mainly speed, usually a contact point away from the bridge, and not too much pressure. The second style uses mainly pressure, with a contact point relatively near the bridge, and slow bow strokes. According to Galamian, skillful violinists are able to alternate between the two styles; before they get to that stage, intermediate players tend to cling to the one style that is more natural to them, which greatly limits their expressive possibilities. An explanation of Galamian’s concept, together with some experimentation on open strings and scales, provides a good introduction to the study of more extreme color changes.

Tone color is also closely related to bow changes and string crossings. Each string has a slightly different sound quality - a phenomenon largely documented by a number of violin instruction books since the Baroque era. Playing a legato scale without abrupt changes on tone color or dynamics is one of the main goals of legato scale study. Different techniques also exert

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an influence on sound; creating smooth transitions between them is another challenge to subtle control of right hand technique.

In the next excerpt, from *Distance de Fee* by Toru Takemitsu, the player is asked to play a line of double stops with an open E drone *as soft as* the previous measure, which is entirely in harmonics. Because harmonics are naturally softer than stopped notes, and the E string’s piercing timbre tends to sound above other strings, some adjustment is needed.

![Fig. 4.7. Toru Takemitsu, Distance de Fée, m. 49 to 52.](image)

Sul ponticello vs. sul tasto

Sul ponticello and sul tasto are the extreme variations concerning contact point (Fig. 4.8). The challenges of both techniques consist both in maintaining consistent sound on either extreme as well as switching between them. When talking about changes in contact point, Ivan Galamian says there are situations that require a “horizontal” change, when the bow glides without sound to a different part of the string, and “oblique” changes, when the bow moves at a slight angle to
the bridge, slowly moving towards or away from it. Dominating horizontal and oblique changes is essential for competent alternation between different contact points.

As with the previous sections of this chapter, this aspect of bowing control can be presented as an exercise with open strings or scales. However, the next excerpts are good examples from the literature. The first, from the first violin sonata by Béla Bartók (Fig. 4.9), asks for sul ponticello alternated with modo ordinario, asks for horizontal switch; the second and third excerpts, from Karel Husa’s Violin Sonata (Fig. 4.10 and 4.11), ask for oblique change.

Figure 4.9. Bela Bartok Violin Sonata n. I, 1st movement, rehearsal 17 to 7 after rehearsal 17.

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Keeping a healthy sound in extreme contact points certainly presents challenges. The following excerpt, from the Violin Sonata by Claude Debussy, indicates *sur la touche* (at the fingerboard). There are specific challenges in executing this passage consistently *sur la touche* through shifts in position, changes in bow stroke (portato and legato) as well as the string changes of measures 96 and 97.
Bow pressure

Extreme variations of bow pressure produce noise and subharmonics. Even though are many more variations on bow pressure noise, both in notation and in practical aspects of execution, playing subharmonics with relative consistency requires more study and a more specific kind of coordination; therefore, this section will be focused on the aspects of its execution. At the same time, while the technique of subharmonics might never be used in performance by the majority of violin students, experimenting with it can be a fun variation of the traditional *son filé* exercises on bow stability.

The main elements of the execution of subharmonics are bow pressure (amount and quality), contact point, and fingering of the left hand. The most fundamental element of production of subharmonics is maintaining consistently heavy bow pressure. Players should at first experiment with any contact point that is neighboring the fingerboard, until they find a bow speed that is not too slow (for that would produce pitchless noise). When that ideal bow pressure and speed is found, the player should try to play longer subharmonic notes, in order to practice the consistency of the stroke. Keeping constant heavy bow pressure is not always intuitive for a violinist. Mari Kimura, in her article about the production of subharmonics, provides a graphic representation of the “mental image” of the differences in bow pressure among regular playing and subharmonics:101

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101 Kimura, “How to Produce Subharmonics on the Violin”, 179.
The players should keep in mind that variations of bow pressure will change the pitch of the subharmonic, even if contact point and speed are kept constant. If they are able to find consistent subharmonic intervals on the open string, using a consistent amount of pressure and contact point, they can start experimenting with fingerings. Fingering near C, D, E, and F on the third position of the G string should produce their lower octaves - except that the exact placement of the finger and bow will vary, according to several aspects, including age of the string, amount of rosin on the bow, and bow tension.\textsuperscript{102} Violinist Nathan Cole, in his video on subharmonics for ArtistWorks.com, exemplifies how the relationship between stopped note and subharmonic is not always of an octave; in his case, the subharmonic sound is a sharp major 7th below, so the note needs to be stopped slightly flat.\textsuperscript{103} Each player has to experiment to find their instrument’s own spots.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure4.13}
\caption{Mari Kimura’s “mental image” of the differences between regular bow pressure and subharmonic bow pressure.}
\end{figure}

\textsuperscript{102} Kimura, “How to Produce Subharmonics on the Violin”, 180.
Tremolo

The tremolo technique, in and of itself, is not complicated. The main goal of specifically studying tremolo is to find a good balance of the setup and movement, so the player can build endurance and tone control without excess tension. In my own experience, extensive tremolo passages represent a difficulty for the entire upper body; it is easy to “lock” the right shoulder joint, and difficult to balance elbow and wrist work. The elbow can tend to be overworked. Fatigue comes quickly, and with it, muscular pain; soon the tension of the right shoulder spreads to the neck and left shoulder as well, making for an unpleasant experience. If the left hand part is difficult or alternates with fast measured notes passages, the challenges are multiplied creating a difficult combination for the player.

In order to avoid physical problems resulting from tremolo passages, it is advisable to slow down a passage and avoid using excessive force. Roger Benedict, in his article about tremolo, affirms that there is little difference between the mechanics of measured and unmeasured tremolo techniques. He suggests that unmeasured tremolo be measured, to facilitate control and sustaining of the tone. Measuring the tremolo allows players to slow down and pay closer attention to the tone and to their breathing pattern, in a way that is “translatable” to a faster tempo. One way of avoiding excessive force is to execute dynamic nuances mainly with combinations of pressure and contact point - the natural weight of the arm provides pressure, which can be controlled with slight changes on elbow angle, while contact point can be changed with different positions on the right arm system. Trying to play louder by adding speed to the bow strokes is likely to cause unnecessary strain to the elbow, which has to work harder to “stop” each impulse.

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104 Benedict, “Tremolo Technique for Violin and Viola,” 78.
The following excerpts are examples of combinations of tremolo with other techniques. The first, from *Miniatures* by Krzysztof Penderecki, combines tremolo with double stops and glissando. The excerpt should be played first without the tremolo. The challenge is to keep a good tone throughout the passage.

Figure 4.14. Krzysztof Penderecki, *Miniatures* for Violin and Piano, m. 2 to 6.

In the second excerpt, from Reveille by Benjamin Britten, more difficulties are added. Here, the tremolo tone has to be kept through the “distractions” of dynamic nuances and left hand pizzicato. Here, the student can play without tremolo at first; then, add a slow measured tremolo, in 16th notes, and coordinate that with the pizzicatos and dynamic nuances. Tremolo subdivisions can be sped up, and then the entire passage, until tremolos seem unmeasured.

Figure 4.15. Benjamin Britten *Reveille*, m. 48 to 52.
Pizzicato

The main challenges for pizzicato in contemporary music are the speed with which it alternates with other techniques. Therefore, students should be aware of study strategies to build speed and dexterity not only in the playing itself, but also in the alternating between pizzicato and regular bow playing hand positions. Martin Wulfhorst affirms that the right arm movement, in pizzicato, is similar to down bow collé strokes, therefore it might be useful for some students to practice pizzicato sections with that arco stroke first, both to check left hand intonation and to build right hand endurance. Practicing this way helps a violinist keep a relaxed posture while playing extended pizzicato passages. The following exercises intend to strengthen the dexterity of the right hand while changing positions, through the practice of alternating pizzicato and arco. They should be played very slowly at first, and sped up progressively, always aiming for relaxed posture through all changes. Notes indicated as regular pizzicato can be played either with the gripping right hand position, or with the extended index finger in regular playing position. Bartók pizzicato should be played gripping the bow with the middle, ring and little fingers.

Figure 4.16. Exercises on alternating pizzicato and arco positions.

The exercises can be practiced with any dynamics, as long as they are consistent (similar volume in both bowing and plucking). Open strings can also be substituted with any scale or musical passage. If more difficulty is desired, the *collé* stroke can be substituted by other bow strokes, such as martelé, ricochet, or others.

The most important aspect of practicing pizzicato technique is to include body weight as much as muscle work. The weight of the wrist and arm can help players achieve more resonant notes if the hand moves outwards instead of upwards, letting the arm weight lead each pluck. The movement is reminiscent of the motion of throwing a rock on the river: muscles are required to place the right arm system where it needs to be; after that, the arm is simply released. This is not intuitive for many players because violin pedagogy methods introduce plucking to beginners as a small upwards movement using only the finger or forearm. Keeping arm and hand stable is a safe strategy, and the best way of achieving certain colors; however, seasoned players acknowledge the benefits of playing with more freedom. Pizzicato should be practiced with all variations as to the angle, direction and finger for the plucking action. Although instruments vary, the author has found that the ideal location for plucking is approximately ¾ of an inch into the fingerboard, with the plucking finger being the index finger. Flattening the slightly and plucking at an angle of produces the best ringing sound. Playing sideways or upwards (touch pizzicato) with my middle finger is ideal for softer and more round sounds. Some players consider their middle finger their strongest. Each person and instrument have their own sound results for each techniques; therefore, it is important that students try each variation and note what results they get. Students can try each variation alone, making a mental note of their favorite sounds and which movement made them happen. This resource could be particularly useful in solo violin and chamber music, where color variations are most desirable.
Col legno battuto and col legno tratto

Similarly to pizzicato, issues with playing col legno are more related with quick alternation with regular arco playing than with the technique itself. The techniques of col legno battuto and col legno tratto are both executed by rotating the bow position enough for the stick to touch the string. There are two variations on how to play col legno: some players rotate the bow clockwise, so the stick faces the scroll; others rotate counter-clockwise. For the sake of practicality, they will be described as Position 1 and Position 2, respectively. Position 1 is made by a different (upside down) grip of the bow. In this position, the hand position feels more natural, but the switch of positions requires time between notes, which makes it impracticable for some passages. In Position 2, the rotation is made by extending the fingers. This position makes alternation between col legno and modo ordinario easier, but the right hand position is very different than usual. Both ways require dexterity of the right hand in order to rotate and hold the bow in a way that is as natural as possible. This is even more crucial if alternations between col legno and other techniques happen quickly.

Many players hesitate in practicing col legno, with good reasons; permanent damage could be done to the (usually expensive) equipment. The hand movement, however, could add to the common training of right hand flexibility. The following exercises intend to train the alternation of regular arco position with col legno. They should be played in soft dynamics. Col legno battuto, as well as ricochet bowings, should be played in the upper quarter of the bow; col legno tratto can be done in any part of the bow, even though it tends to sound better on the detaché areas of middle and upper half.
Figure 4.17. Exercise in alternating col legno battuto and modo ordinario positions.

Figure 4.18. Exercises in alternating col legno tratto and modo ordinario positions.

The excerpt below, from the fourth movement of the piece *Dialogos*, by Mario Lavista, adds extreme dynamic changes to the alternation of col legno tratto and modo ordinario.

Figure 4.19. Mario Lavista, *Dialogos para Violín y Piano*, D, m. 11.\(^\text{106}\)

\(^{106}\) With kind authorization of Mario Lavista.
Conclusion

The discussions in this paper are based on the fundamental idea that the process of learning an instrument consists in establishing conscious connections between written musical concepts, specific movements, and specific sounds. Every concept grasped from all these angles becomes a new color in the musician’s palette, or a new tool in a toolbox, which they can use to understand and relate creatively with a piece of music. Throughout their education, music students make new connections and solidify the ones already established; with further experience, the use of each tool becomes more intuitive, and the creative mind builds new connections of meaning among them. In other words, when knowledgeable practice meets experience, mechanical execution is easy, and expressivity flows.

The issue of contemporary extended techniques as tools is that they tend to be introduced only on the later stages of a student’s education – often so late that there is not enough time to build a natural execution before the young musician becomes a professional. This happens for many reasons, but one of them is certainly the lack of introductory methods specific for these techniques. Interested musicians find countless methods explaining and exercising each aspect of playing necessary to execute Mozart or Bach; players of modern and contemporary music currently do not have this luxury. However, as Paul Zukofsky mentions in the introduction of his scale book, “a total rejection of the old training is not called for since very little of what we are asked to do in new music is really new.”\textsuperscript{107} No method is good for every player, but methods are good - the fact that we can draw ideas from so many different sources is likely the main reason traditional violin teaching is as efficient as it is today. This dissertation intends to add to the

\textsuperscript{107} Paul Zukofsky, All-interval Scale Book: Including a Chart of Harmonics for the Violin (New York: G. Schirmer, 1977), ii.
current canon of violin technique methods, and hopes it expands even more in the direction of modern and contemporary music.

In this paper, I have written about my own experience with the performance and study of extended techniques, in regards to associations between symbols, sounds, and movements; other students, musicians, and pedagogues have made and will keep making different connections that are just as valid. Furthermore, the product of my deliberations might not seem useful to some, who rightly put more trust in the power of the subtle communication processes that happen in person as part of a lesson or coaching session; as previously mentioned, expressing subjective sensations and conceptual understandings verbally is hardly an exact science. However, discussing these issues on paper will, I hope, facilitate other critical evaluations and enable the creation of different, perhaps more elaborate connections, which in their turn have the potential to make our experience as performers, students, and teachers more diverse and fulfilling.
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Mariana Krewer, a native of São Sebastião do Caí, Brazil, is a violinist and violin teacher. She began her violin studies at the age of 14, when an interest in progressive rock and heavy metal brought her to violin lessons. Mariana’s passion for the vast soloistic violin repertoire kept her on the concert side of music, but her curiosity for different styles and sounds is still what guides her career. After graduation, she will be living in Salvador, Brazil, as a violinist with the Orquestra Sinfônica da Bahia.