## FACTA UNIVERSITATIS

Series: Visual Arts and Music Vol. 9, ${ }^{\mathrm{o}}$ 1, 2023, pp. 41-50
https://doi.org/10.22190/FUVAM230323004D

## General paper

# THE ROLE OF FINGERING IN CREATING MUSIC ON THE PIANO 

UDC 786.1.09:781.68

Marija Dinov<br>Independent Researcher, Niš, Serbia


#### Abstract

The focus of this article is the role of fingering in performing art of pianists. Fingering is a thoughtul determination of the exact order in which fingers are used in a given musical phrase. The main purpose of this paper is to explain how fingering, as an element of the composition created by the performer, affects the expressiveness of the performed musical phrase. The central analysis is aimed at illustrating how various expressive effects can be achieved by using different fingerings to perform the same written musical phrase. As a specific example we showed that the use of different fingers in a certain musical context can produce different cognitive and emotional responses in the mind of the performer, and thus affects the understanding of the music being performed.


Key words: fingering, movement, musical phrase, gesture

## 1. Introduction

Piano playing is an artistic discipline whose purpose is to create music on the piano. It is usually described as a technique, skill or artistry in playing the piano. The term also refers to the performance of a pianist, and to the composition or adaptation of music for the piano. In the academic field, pianism has been studied within the framework of the history of piano literature, musical performance studies, stylistics, aesthetics and piano pedagogy. But there are not many phenomenological studies about pianism where the gestures of pianists are placed in the epicentre of analysis.

Music performers use their body movements, or performative gestures, in order to create the musical-poetic content in a synergistic - audible, visual, kinetic, and kinaesthetic performing form. A performative gesture in pianism is a profiled hand movement that creates a musical expression, usually notated in the score as a musical phrase. The elements that shape the musical phrase and profile the performative gesture are pitch, duration, and articulation of

[^0]sounds. In piano performance "the meaning of the phrase determines the position and motion of the hand" (Schenker 2000, 9). It means that the position and movement of the hand (material, physical carriers of the musical expression) are conditioned by the form of the phrase (as a symbolic musical idea), and the articulation (shaping) of the performative gesture is related to the connotative field that a particular musical idea can symbolize (Dinov Vasić 2019, 4).

In the process of creating performative gesture on the piano, the "control of finger movement and position to achieve physiological efficiency, acoustical accuracy (or effect), and musical articulation" (Randel 2003, 315) has a crucial role. This "aspect of instrumental technique" is called fingering and it is "directly related to the manner in which vibration is initiated and the means by which its frequency is regulated" (Ibid). Bearing this in mind, the first intention of this study is to show how fingering affects the expressiveness of a performed musical phrase. Its second aim is to indicate that the fingering, as a performative articulation of the notated musical phrase, is the element of composition exclusively created by the performer. These aims are achieved through a comparative analysis of expressive effects produced by different fingerings of the same (notated) musical phrase.

## 2. The Artistic Dimension of Fingering Technique

The basic focus of musical performance studies is the exploration of the relationship between the musical notation and its performance through specified and transparent body movements. According to the prominent music theory, these body movements are defined as gestures, i.e. movements that can communicate and transmit musical and poetic content to the recipients. Given that the concept of musical gesture encompasses a large area of musical phenomena that range from the physical production of sound to the more universal emotional and metaphoric images of music, the body movements used by musical performers are distinctly termed as performative gestures.

The kinetic movements that embody the music are written in the score. They are determined by three basic parameters: pitch (frequency), duration (rhythm), and articulation (shaping) of the sound. Beside them, the marks for meter, dynamics, and tempo can be entered in the score as well. To perform a written musical phrase (or musical gesture) on the piano means to press the key that corresponds to the notated pitch with a finger, then to keep the notated duration of the produced tone with the finger or pedal, and to connect that tone with the next one in a manner suggested by articulation marks (unless it is the tone with which the musical piece ends). The pitch, duration and articulation of the notes that compose a musical phrase, together with the values of its meter, dynamics and tempo, form its unique expression that can be perceived as a specific 'character' of the performed music.

The notation of musical work "is considered the unalterable will of the composer", and it must be "interpreted literally" (Schenker 2000, 5). At the same time, the fact that musical notation "hardly represents more than neumes should lead the performer to search for the meaning behind the symbols" (Ibid). In that quest, the hand plays an essential role. The hand forms its gestures in accordance with its own sense for the musical expression. Thus, "the meaning of the phrase determines the position and motion of the hands" (Ibid. 8). It is important to understand that a musical score represents a sequence of choreographic movements with determined spatial coordinates on the keyboard that are performed within
defined temporal frames. In musical performance practice, the 'meaning' of a musical phrase is formed in the movement of the performer's hand, and all formative conditions that shape a notated musical gesture into an embodied motion are unified by one element of piano technique. This element is colloquially called 'fingering'.

Fingering is a system of symbols (usually Arabic numbers) used by musicians for the fingers of the hand (or some subset of them) in order to associate specific notes with specific fingers (Randel 2003, 314). In notation for keyboard instruments, numbers are used to relate to the fingers themselves, not to the hand position on the keyboard. In modern scores, the fingers are numbered from 1 to 5 on each hand: the thumb is 1 , the index finger is 2 , the middle finger is 3 , the ring finger is 4 , and the little finger is 5 .

A particular fingering can be the result of the working process of the composer who puts it into the manuscript; an editor, who adds it into the printed score; or the performer, who puts his or her own fingering in the score or in performance. In his famous Essay on the True Art of Playing Keyboard Instruments, Carl Philipp Emanuel Bach wrote that "correct employment of the fingers is inseparably related to the whole art of performance" (Bach 1949, 41). It is important to emphasize that a fingering is always designed by the position of the performer, no matter who marked it in the score.

Fingering is the only element of the musical text that the performer can change, even when it was written in the score by the composer himself. Most pianists share the opinion that the main function of good fingering is to make the hand movements as comfortable as possible without changing hand position too often. There is a well-known example of fingering written down by an authority such as Beethoven himself, which no pianist plays because it is not only unpleasant, but considered impossible to perform. The question is why Beethoven, who was an excellent pianist himself, wrote such a questionable fingering for the figure of broken octaves (measures 84-89 and 304-309) in the first movement of his A major sonata op. 2 no.2. The only meaningful answer would be that Beethoven didn't want comfortable fingering in that place at all. For him, fingering obviously had another function besides making the movement of the hand as flexible as possible, and that function is certainly directly related to the embodiment of the written gestural expression.

The performer's search for the 'meaning behind the symbols' has the characteristics of a heuristic approach. When a pianist interprets a piece of music, (s)he "initially accesses a work's gestures by the simple heuristic of sitting down and trying them out - feeling what the hands must do to cover the notes at the right times, gauging the flexibility that leaps or sudden shifts demand, and then inspecting one's bodily engagement for clues as to expressive correlates" (Hatten 2004, 120). Many music scholars agree that "a heuristic approach is often the best one can hope for when learning an avantgarde composition" (Ibid). Although "one might expect the music of one's own age to come with a gestural realization transparently encoded in the style as well as the culture" (Ibid.), and that the music of one's contemporaries should be performed exclusively in the way that the composer imagined or performed it himself, in performance practice such expectations are unrealistic.

The attitude that the composer Claude Debussy, an excellent pianist himself, had towards this question is indicative. When he was composing new pieces for the piano, he would often ask his friend and colleague Isidor Philipp for advice on notation. Isidor Philipp was a French pianist, composer, and pedagogue. Debussy highly valued Philipp's knowledge and teaching experience. He respectfully accepted Philipp's advices regarding the notation of his piano compositions, so that pianists would be able to better understand his nuances and approach. After considerable deliberation, they both decided that almost
no pedal markings should be used in any of the published pieces. Their arguments were that every piano is different in quality, every room or hall is different in size and resonance, and each pianist has different capabilities. To lock in one form of pedaling to cover all possible circumstances would place the pedaling notation above the effects that Debussy wished to achieve. They decided that pedaling should be written in the score only where it is absolutely necessary, and gave to the pianist the `authority` to use it as needed (Serdar 2012, 70).

In his book How to play and teach Debussy (1932), a piano method with exercises and examples from Debussy's piano pieces, Dumesnil who studied the piano at the Conservatoire de Paris with Isidore Philipp and as a student of Claude Debussy, has given us a lot of interesting details of how this music should be played. Dumesnil states that in his whole piano opus Debussy "limited himself to a few mentions of les deux pedales (the two pedals), and his indications of the damper pedal alone, are exceptionally scarce", while most of his compositions have none of these indications at all (Dumesnil 1932). According to Dumesnil, Debussy "seemed almost as reluctant to write down any indications in this direction, as he was about the fingerings" (Ibid). Debussy believed that the imposed fingering "cannot logically adapt itself to the different formations of the hand", and that "the absence of fingerings is an excellent exercise" for the performer who will always be best served by the instinct of his own hand (Ibid.). By leaving full freedom to create their own fingerings to the performers, Debussy gave them the legitimacy of creative artists.

## 3. The Role of Fingering in Creating the Expressiveness of a Musical Phrase

In order to plastically indicate the role of fingering in creating the expressiveness of a musical phrase, we will use the analysis of the artistic effects that arise from three fingering variants of the same melody, the opening theme (Example 1) of Debussy's prelude The Girl with the Flaxen Hair (La fille aux cheveux de lin), which consisted of three-note figures, grouped together as one eighth note and two sixteenth notes (Lederer 2007, 98).

Example 1: The Girl with the Flaxen Hair, Measure 1-3, urtext (Debussy 1910, 31)


The character of the composition indicated by the tempo mark implies a performance that is 'very calm and gently expressive' (Très calme et doucement expressif). The metronome mark is sixty-six quarters per minute. However, at the very beginning, next to the mark for quiet dynamics ( $p$ for piano), there is also the expression sans rigueur that indicates the natural flexibility of the rhythmic flow of the melody. According to Maurice Dumesnil the expression sans rigueur means 'without stiffness in rhythm, not too metronomically'. In this regard, Dumesnil insists on careful performance in order to preserve the 'line' throughout the piece. There should be no excesses either in tempo or shadings during the performance. The entire
piece must be played extremely delicately and with full respect for the expressiveness of each tone, starting from the first. This eighth note tied over into the next beat must be given its full value (Dumesnil 1932).

The predominant articulation in the prelude is the so-called carezzando touch, which was used by generations of French pianists before Debussy. It is a very gentle, refined, and kind of caressing touch, in which the finger glides the surface of the key from the middle towards its outer part (Serdar 2012, 57). The movement should be performed with relaxed outstretched fingers that 'take' the keys with a particularly caring and flexible hand motion. This manner of playing is suitable for the articulation of a smooth musical phrase formed by tones of uniform volume without redundant accents. With these movements, it is possible to shape a musical expression on the piano in perfect legato technique and in all dynamic nuances, even the extremely quiet and delicate ones.

Perfect legato articulation is particularly important in the performance of this prelude. Aside from the carezzando touch, extreme legato articulation can be achieved with the technique called 'finger substitution', which is a change of fingers on one key without interruption or repetition of the sound. This technique is often used to create a connected, flowing legato phrasing, or smooth out sequence of tones. Changing the finger on the same key is "an eminent aid in producing a true legato" (Schenker 2000, 26). According to Henrich Schenker, the finger substitution technique gives an impression similar to the sound transmitted by a singer or violinist who enlivens the sound with a spun-out breath or a bow stroke. In the same way a pianist gives an illusion of "spinning the sound on" by changing fingers on one note. The changing of fingers "approximates a continuous presence without finger change and the sound appears fixed" (Ibid, 28).

The first tone of Debussy's prelude The Girl with the Flaxen Hair (d flat) can be played in three ways: starting with the fifth finger of the right hand, which is the most uncomplicated manner of playing; then with the fourth finger of the right hand, which is the most common case; and with the third finger of the right hand, which is rarely used although it is adequate. The next tone of the melodic line (b flat) in each of the three cases fits after the fifth finger and it is most naturally played with the fourth finger (Example 1). This means that in two latter cases the pianist must substitute the finger from the fourth to the fifth, or from the third to the fifth. Each of these three variants of the fingering has a different choreographic expressiveness. Live performances of the prelude's opening theme that will be referenced in this paper can be seen in videos available on YouTube, a global online video sharing and social media platform. Links to videos are listed in the Webography section.

The variant of playing in which the initial tone is taken with the fifth finger can be seen in performances of Angela Hewitt and Marnie Laird (for video links see the Webography section in References). This variant of fingering fully corresponds to the general principles of choosing a good fingering, according to which hand movements should be made as comfortable as possible without changing the position of the hand too often. The notation of this fingering is shown in Example 2. The fingering was set by pianist Eberhardt Klemm in his edition of Debussy's Preludes (Klemm 1969, 35).

Example 2: The Girl with the Flaxen Hair, Measure 1-3, Klemm's edition


At the same time, if this eighth note tied over into the next beat must be given its full value in rhythmic sense (Dumesnil 1932), then this tone must be well 'counted'. In music, counting is a system of regularly occurring sounds used to identify the beats. In performance practice it is verbally counting the beats in each measure of the piece in the order in which they appear. The beat is the basic unit of musical time. It is a regularly repeating event also called the musical pulse. The audible or implied musical pulse is "one of a series of regularly recurring, precisely equivalent stimuli", which "like the tick of a metronome or a watch" marks off "equal units in the temporal continuum" (Cooper and Meyer 1960, 3). This phenomenon is an important part of musical experience. The established sense of the pulse "tends to be continued in the mind and musculature of the listener, even though the sound has stopped", because "the human mind tends to impose some sort of organization upon such equal pulses" (Ibid). Taking this into account, in the context of playing the opening theme in Debussy's prelude, the performer needs to make a good temporal organization of the sound, that is, to achieve an optimal relationship between the duration of the first note and the following ones. This relationship must be established within the framework of the natural musical pulsation logic, but in this case the musical pulse should be embodied more discreetly and non-transparently, in order to avoid rhythmic and metrical rigor, because it is the motion that the composer clearly required with the sans rigueur expression mark (Example 1). And if the initial tone of the prelude is played directly with the fifth finger and without finger substitution, according to Schenker (2000, 28), that would make an impression of the 'fixed sound', which does not correspond to the 'atmosphere' of the piece that represents a musical portrait of "the girl with long, flaxen curls" (Dinov Vasić 2018, 65). On the other hand, the finger substitution technique gives the impression of 'continuous presence' and creates the illusion of 'spinning sound' (Schenker 2000, 28), which is a better response to the request of a 'curved' or 'spiral' sound shaping.

Since Debussy's time, most pianists have preferred the technique of finger substitution in the performance of this prelude. The establisher of this tradition is the aforementioned student of Debussy, pianist Maurice Dumesnil, who set the fingering for this prelude in his famous essay (1932, Example No. 23). He suggests that the first tone of the initial phrase should be taken with the fourth finger of the right hand, and then the finger should be silently replaced with the fifth finger (Example 3) so that the next tone in the phrase could again be taken with the fourth finger. This variant of playing can be seen in performances of Katharina Treutler and Lang Lang (for video links see the Webography section in References).

Example 3: The Girl with the Flaxen Hair, Measure 1-3, Dumesnil's redaction


This form of fingering has two vital elements that should be explained in more detail. First of all, the finger substitution technique that Dumesnil uses is fully in accordance with the composer's intention to create a tonal image of a girl with curled flaxen hair. This act can be accomplished by replacing the fourth finger that presses the key with the fifth finger, or the key can be pressed with the third finger and replaced first with the fourth and then the fifth finger. Dumesnil, like most pianists, opted for the first of the two variants. The fourth finger is the most fragile and least independent finger on the human hand. The most delicate way to perform a tone on the piano is to press the key slowly and softly with the stretched fourth finger in carezzando articulation.

Apart from these 'anatomical' reasons, there is another significant aspect of the finger substitution technique that can explain Dumesnil's proposition for performative choreography of the notated musical phrase. In his essay The Art of Performance Schenker wrote about "the most perfect legato effect" that "comes from the continuing dragging along of one finger", which creates "the effect of a series of tones executed only by the fifth or fourth finger" (Schenker 2000, 28). This fingering develops "a special kind of unity" that "resembles a single breath or bow stroke" and "allows the tones to flow into one another with an intimacy unequaled by any other legato technique" (Ibid.). This technique is identical to the fingering that Dumesnil uses for the first two notes of the prelude: the first tone is taken by the fourth finger, which is then quietly replaced with the fifth finger so that the fourth finger is free to take the next tone in the phrase (Example 2). This technical practice, in which the tones are played consecutively with the same finger, gives the pianist the possibility to achieve exceptional timbre uniformity in the melodic line. It is difficult to achieve the same color of different tones that form a melodic line on the piano. Each finger has different physical potentials on which the quality of the produced sound depends. If each key that forms a melody played on the piano is pressed with the same finger in the same way, the timbre of produced sounds will be equal in quality, giving the impression that the whole melody has a unique 'color'. Bearing in mind this specific element of piano performance practice, it can be concluded that Dumesnil's fingering is supremely logical.

The third variant of the fingering has specific elements that make its expressiveness different from the first two. This variant of playing (Example 4) can be seen in performances of Ilya Itin and Eloïse Bella Kohn (for video links see the Webography section in References).

Example 4: The Girl with the Flaxen Hair, Measure 1-3


The third finger is much stronger than the fourth, which makes it a better choice if the performance of the piece takes place in a big hall. But in smaller chamber rooms or halls, it is more justified to start this extremely delicate piece of music with a more sensitive and subtle finger. Besides, if the first tone of the phrase (d-flat) is played with the third finger subsequently replaced with the fifth, this means that the next tone in the phrase (b flat) should also be played with the third finger rather than the fourth, because it is easier to achieve a unique 'color' of the melody in that way. Consequently, the tone b flat and the following tone g flat should be played unnaturally, with the third and the second finger, and not with the fourth and the second finger as Dumesnil suggested (Example 3).

There is another reason why the fourth finger is the ideal choice for playing the opening tone of the prelude. The first tone in the phrase lasts one and a half beats and it needs to be completely rhythmically sustained so that the beauty of the tonal color has a chance to reach its full expression. During the pulsation of that tone, a choreographic movement of finger substitution from the fourth to the fifth finger is performed, or, in the case that the prelude starts with the third finger, from the third to the fourth and then to the fifth finger. In the first variant of fingering the movement consists of two moves, while in the second variant it is composed of three steps. In music, tempo is a "psychological fact as well as physical one" (Cooper and Meyer 1960, 3). For example: "eight-notes in two pieces of music may move at the same absolute speed, but one of the pieces may seem faster than the other. Psychological tempo depends upon how time is filled - upon how many patterns arise in a given span of time" (Ibid.). In this sense, Dumesnil's version of the finger substitution with two events in a given span of time will psychologically appear a shade slower than another variant of the finger substitution with three events in the same time span. Also, Dumesnil's fingering wouldn't give an impression of the 'fixed sound', as in the variant where the initial tone of the prelude is played directly with the fifth finger and without finger substitution. It can be noticed that Dumesnil's reaction of the fingering corresponds to the atmosphere of this lyrical music in the psychological, as well as in the physical sense.

## 4. CONCLUSION

From the analysis and discussion above, it is evident that fingering technique plays an essential role in piano performance. With profiled fingering, a pianist creates a performative gesture that embodies an imagined musical phrase. The piano keys arrangement is such that any key may be depressed by any finger, which means that theoretically a musical phrase can be played on the piano with any fingering. A notated piano composition can also be 'played' or 'sounded' by a programmed artificial intelligence, and in the case when the
performance is not available to the visual perception of the audience, the fingering and body movements of a performer do not affect the perception of music. But when it comes to live performance, body gestures of a performer must be naturally aligned with the kinetic flux of the musical phrase, which means that fingerings and all other body movements must follow the metrical, dynamic and temporal logic of the music they create; otherwise, the audience will not be able to perceive the performance as a sequence of meaningful musical expressions.

Performative gestures are also a kinesthetic phenomenon. Kinesthesia or proprioception, as a sense that enables the perception of the position, movement, and action of one's own body, allows the performers to understand their own gestures created during performance. In this regard, it was shown on a specific example that the use of different fingers in a certain musical context can produce different cognitive and emotional responses in the mind of the performer, and thus affect the understanding of the music being performed. Every finger, like every part of the body, has its own expressive capacity. Given the points presented and discussed in this paper, it seems that pianists can and should intently study what is effective in the fingering and other body movements involved in generating the music they perform. The body movements and music are intrinsically bound together, especially within the live performance context.

## References

Bach, C.P.E., (1949), Essay on the True Art of Playing Keyboard Instruments, (trans. and ed. by W.J. Mitchell), W.W. Norton \& Company Inc, New York.
Cooper, G. and Leonard B. Meyer, L. B., (1960), The Rhythmic Structure of Music, University of Chicago Press, Chicago.
Dinov Vasić, M., (2018), "Slika Devojke sa lanenom kosom u zvuku debisizma", Lipar 65: pp. 57-72.
Dinov Vasić, M., (2019), Studije izvođačkih umetnosti: performativnost i funkcija telesnog gesta u pijanizmu, Doctoral dissertation, University of Arts in Belgrade. (Available at: Studije izvođačkih umetnosti: performativnost i funkcija telesnog gesta u pijanizmu (bg.ac.rs), February 24, 2023)
Dumesnil, M., (1932). How to Play and Teach Debussy, Schroeder and Gunther Inc., New York. (Available at: How To Teach and Play Debussy (stevepur.com), February 24, 2023)
Hatten, R.S., (2004), Interpreting Musical Gestures, Topics, and Tropes: Mozart, Beethoven, Schubert, Indiana University Press, Bloomington and Indianapolis.
Lederer, V., (2007), Debussy: The Quiet Revolutionary, Amadeus Press, New York.
Randel, D.M., (ed.), (2003), The Harvard Dictionary of Music, Fourth Edition, Harvard University Press, Cambridge, Massachusetts and London.
Schenker, H., (2000), The Art of Performance, (trans. by I.S. Scott), Oxford University Press, New York/Oxford.
Serdar, A., (2012), Razvoj pijanističke tehnike, Muzički centar Crne Gore, Podgorica.

## Sheet Music Editions

Debussy, C., (1910), Préludes pour Piano (1er Livre) par Claude Debussy, Durand \& Cie, Paris. (Available at: IMSLP521885-PMLP2394-Debussy_Claude-Préludes_1er_Livre_Durand_7687_scan.pdf, March 05, 2023)
Dumesnil, M., (1932). How to Play and Teach Debussy, Schroeder and Gunther Inc, New York. (Available at: How To Teach and Play Debussy (stevepur.com), February 24, 2023)
Klemm, E., (ed.), (1969), Claude Debussy: Klawierwerke, Band II, Edition Peters, Leipzig: pp. 1-65. (Available at: IMSLP246411-PMLP02394-Debussy,_Claude-Klavierwerke_Peters_Klemm_Band_II_01_Preludes_1er_ Livre_scan.pdf, March 05, 2023)

## Webography

Angela Hewitt, (Video shared on YouTube in 2020), Available at: Angela Hewitt performs Debussy La fille aux cheveux de lin from home • Toronto Symphony Orchestra - YouTube, March 05, 2023.
Marnie Laird, (Video shared on YouTube in 2018), Available at: Debussy - La Fille aux Cheveux de Lin (Marnie Laird, Piano) - YouTube, March 05, 2023.
Katharina Treutler (Video shared on YouTube in 2014), Available at: Debussy: La fille aux cheveux de lin, Katharina Treutler I piano - YouTube, March 05, 2023.
Lang Lang (Video shared on YouTube in 2011), Available at: Lang Lang - Claude Debussy, La Fille aux cheveux de lin - YouTube, March 05, 2023.
Ilya Itin (Video shared on YouTube in 2016), Available at: Debussy - Preludes Book I - YouTube, March 05, 2023.
Eloïse Bella Kohn (Video shared on YouTube in 2014), Available at: Debussy - La fille aux cheveux de lin - Eloïse Bella Kohn - YouTube, March 05, 2023.

## ULOGA PRSTOREDA U KREIRANJU MUZIKE NA KLAVIRU

Tema ovog rada je uloga prstoreda u pijanističkoj izvođačkoj umetnosti. Prstored predstavlja promišljeno određivanje tačnog redosleda korišćenja prstiju u određenoj muzičkoj frazi. Glavna svrha rada je da objasni kako prstored, kao element kompozicije koju kreira izvođač, utiče na izražajnost izvedene muzičke fraze. Centralna analiza ima za cilj da ilustruje kako se različiti izražajni efekti mogu postići korišćenjem različitih prstoreda za izvođenje iste zapisane muzičke fraze. Na konkretnom primeru pokazano je da upotreba različitih prstoreda u određenom muzičkom kontekstu može proizvesti različite kognitivne i emocionalne reakcije u svesti izvođača, a time i uticati na razumevanje muzike koja se izvodi.
Ključne reči: prstored, pokret, muzička fraza, gest


[^0]:    Received March 23, 2023 / Accepted May 14, 2023
    Corresponding author: Marija Dinov
    Niš, Serbia
    E-mail: marija.e.dinov@gmail.com

