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Original article

PIANO PLAYING, COMPLEMENTARY ACTIVITY FOR THE RECOVERY OF A TRAUMATIZED ARM

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Abstract

Aim. The aim of this study is the developing of a new direction in arm recovery over a traumatic incident. One work method that has a beneficial influence in this recovery is that known as occupational therapy.

Methods. Our proposal is to introduce as a result of this method a series of piano technical exercises which aim the enriching the physical and kineto-therapeutic exercises in order to recover the mobility and motor function of the hand.

Results. The results of occupational therapy in running programs are evaluated depending on the obstacles and limits of any subject, leading to a constant re-evaluation. The occupational therapy plays an important role in the recovery of hand after any shock.

Conclusion. The conclusion is that such a recovery occupational therapy may be beneficial by implications both at physical and mental level.

Keywords: rehabilitation, occupational therapy, piano exercises.

Introduction

This study is inspired by a border area between the two areas difficult to access and that may pique the interest of both, musicians and specialists in physical therapy. What interests us directly is the activity for the recovery of the upper limb through an enjoyable activity different from the ordinary activities of a patient. This new type of complementary activities of occupational therapy, wants to open new horizons with favorable results both at physical and emotional level through new exercises as well as the satisfaction and the fulfillment given by any kind of artistic activity.

The content developed in this work was firstly inspired by the current activity of a piano teacher activity, in which occasionally, over time we as teachers had the experience of working for hand "recovery" with some students who suffered various traumas of the superior limbs (thumb fracture, fracture of the proximal phalanx of the index finger and medius, comminuting fracture, multiple fractures to the radius). Second, through out our personal training as piano players (performers), we quite often we had to endure some painful consequences from the hands positions, the wrist (*poignet*), back position, from various reasons, such as super required or overloading the muscles, joints, or poor posture of the back, of the arms, shoulders, etc.

The exercises described below are generally known to all or piano teachers, as a set of technical exercises for warming the muscles and joints being gradually expanded to a degree of difficulty that aims to develop muscle strength, the agility of each finger and virtuosity required to any professional performer. On the other hand, the study of a musical instrument can be considered a given system of answers to a signals system. The components of this system are: development of ideal motric action; its execution; the instrument response (the effect); the perception of information; development and implementation of corrections according to received information. It results that the chaining "information-decision-action", the decision becomes reverse share information, which explains the cyclical nature of the study process. (Răducanu, 2003).

Methods

The recovery treatment is differently applied according to age (children or adults - youth or seniors). For adults, kinetotherapeutical movements may be accompanied in addition to ultrasound, also differentiated by the trauma category. In children rehabilitation the exercises may be accompanied by massage. If any of the nerves area after trauma was affected, the degree and recovery period will be prolonged. Even if the traumas areas can be found only at the hand, forearm, elbow, arm or shoulder, recovery will be done by association (shoulder with arm, elbow with hand, etc.).

A special role in the recovery is dedicated to occupational therapy programs in pursuit of which are applied general rules of choosing, adaptation and ordering activities which must comply with clinical and functional aspects and pathology characteristic for handicapped hand with particularities imposed by each type of pathology

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(Sidenco, 2005).

The occupational therapy is the concluding part of the functional rehabilitation program through willfully activities that allow practice of gestures created to engage primarily interested tendinous structures of hand lesion (Iaroslav, 2002).

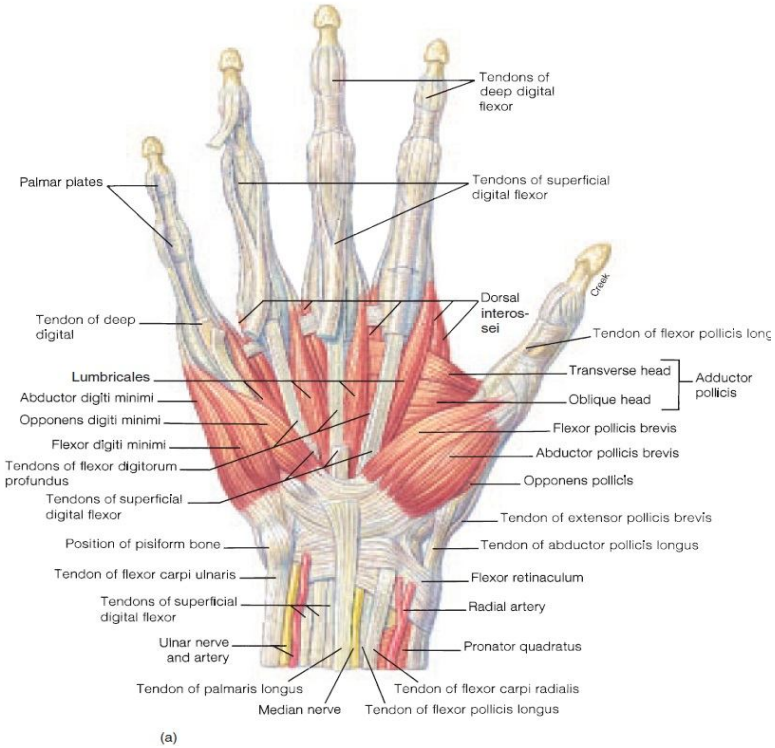
In general, occupational therapy goals are to: educate and re-educate hand motricity; education or re-education sensorial and psychomotor function of the hand; orthopedic supervision; functional rehabilitation and adaptation to disability; independence of everyday life. (Sidenco, 2005) These principles are adapted therapy achieved a recovery program that specifically regards: prevention of mobility limitation / recovery of mobility at all levels of functional complexity hand and punch; increasing passive range of motion at all levels; increasing muscle strength; increasing the resistance to the activity (Sidenco, 2005).

Using the piano as a tool in recovery treatment by means of occupational therapy is justified because pianistic interpretation involves the use of different muscle groups in a particular way in which the entire body should be relaxed. While playing a new support point occurs. This is the piano keyboard, which is reached through the transmission belt formed by the arm and fingers... (Paladi, 2012). Occupational therapy through the piano playing allows various adjustments which is actually personalization of the treatment. Therefore it can be used at any stage of treatment offering permanent full control of results. Recovery work is done by studying the instrument and the key factors of this are exercises and training activities. By exercise is meant a systematic repetition of the same activities that increase performance and improve the mode of action. (Răducanu 2003). This effort is done gradually progressive, starting with easier and short formulas, which then progresses to complex exercises requiring a greater effort.

Results

The hand is represented by palm, back of the hand and fingers (Fig. 1 Hand Anatomy, http://healthfavo.com/hand-anatomy.html). It contains five metacarpal bones, 14 phalanges, intrinsic muscles innervated by the median nerve, radial or ulnar tendons (extensors and flexors) metacarpal joints, intercarpiene, interphalangeal, ligaments. The movements of pressing, lifting, gripping are made through the flexion and extension of the hand.

Fig. 1: Hand Anatomy



In order to correlate information from the two areas covered, it is necessary to submit the name of fingers therefore using pianistic terms: Thumb (Pollex) – first finger; Index (Secundus) - finger 2; Middle (Medius) - finger 3; Ring (Annularis) - finger 4; Pinky (Minimus) – finger 5.

As a follow, we propose a series of exercises that can be carried out in order to recover the

mobility of the arm in general, and of the hand, in particular. Exercises can be assigned to any type of the three categories, which according to the dominant effect may take into consideration flexibility awareness and muscle development (Schmitt, 1979).

Each finger that aims to acquiring mobility must carry out flexion and extension movements (bending, pressing and stretching, lifting).

The exercise that aimed to acquiring mobility in a short term is achieved by repetition of moves. In musical terms this represents the resumption of the musical notes several times, and the execution is carried out using the same finger. Like other exercises they can perform first separately and then together for effective coordination of both hands.

Then, there can be executed on the piano a succession of five or eight consecutive sounds (musical scales) by articulated pressing (not superficial) each finger. Exercises can be made in an ascendant or descendent way at least three times for the same sequence of notes with each hand separately

Another exercise can be done by carrying out a series of progressive intervals of distances from two to five tones (from the second to fifth), in both directions, alternating playing them with one of the external fingers of the hand. If for the upward direction the support finger is finger one, for the downward one, the support finger is finger five. The exercise can be done first separately by each hand and then with both hands for simultaneous coordination.

Also, there can be performed exercises that involve keeping a constant distance between the fingers, musically translated as a series of thirds (intervals containing a distance of three sounds). This will be done first gradually, with successive presentation of sounds and then by pressing simultaneous the keys involved. It can be used for any combination of fingers such as 1 with 3, 2 with 4, or 3 with 5.

To achieve the opening of the palm exercises that lead to its extension can be imagined, starting from intervals with low difficulty and ending to those that require some effort. Thus we start with fifth intervals (5 steps) and sixth (6 steps) and then continue with the seventh (7 steps), eighth (8 steps), ninth (9 steps) or even more.

As in previous exercise, pressing the keys will be made first successively (melodic intervals) then simultaneously (harmonic intervals), upwards and downwards.

The succession aims flexion, extension, precision attack, concentrate and relaxation of hand in the air.

All these exercises as well as the others alike must be done gradually according to different degrees of difficulty starting from using first finger, then 2, 3, following through combinations a logical alternation unitary and even aesthetics.

Another interesting exercise is the one involving flexion and adduction movement on the thumb with any of the other fingers of the hand. The exercise involves rotating and positioning the thumb finger under the palm upwards and passing other fingers over the thumb downward. The first finger makes opposability and flexion and extension by inter-phalange joint.

In the same sphere of interest the following exercises that propose changes of fingers by replacing of the finger 2, with 3 or 4 can be added.

The alternation of a sound with groups of 2 simultaneous sounds made in an upward and downward way can lead to the same enforceability of the thumb.

The forearm refers to the region between the carpal bones and cubital fossa and it is sustained by the ulna and radius bones and a muscular complex package structured in three lodges: anterior, lateral, posterior.

Traumas suffered in this area affect in generally rotations movements: supination, pronation, lateral flexion and extension or inclination (left-right) of radio-carpal joint (a poignet's). The exercises mainly aim to recovery the force and the mobility of forearm muscles.

For flexion exercise successive iterations of the same notes two or three times in a row of indicated sounds must be carried out. The repeating of the same sound can be useful to be achieved by alternating two kinds of power: loud (forte - f) and gently, softly (piano - p). It can perform repetitions progressive, from hard to slow and reverse, as well as various combinations of these: *f / p, ff / pp, ff / f / p / pp pp / p / f / ff*, etc.

For extension exercises the interest is given by the execution of concomitant sound structure that imposes the simultaneously pressing of two keys creating harmonic intervals of different sizes (thirds, fifths, eighths) or others structures covering several keys in order to form musical cords (three to five tones). By gradually pressing the function of flexion and extension is achieved.

There are examples in music history where some piano players had chosen various actions, not too healthy, to encourage faster results in intention to force hand extendibility.

Frédéric Chopin, for example, used for a short time during childhood, a method that involved inserting pieces of wood between his fingers when his hand was kept standstill, to acquire greater intervals on the keyboard. (Coman, 2009).

For exercise that regard lateral inclination it is recommended to execute small series of consecutive sounds (short arpeggios) or large series

of consecutive sounds (long arpeggios) that suppose the successive pressing of keys spaced at a certain fixed areas.

Then, rhythmical and melodically formulas can be performed, formulas that have as a target the same group of exercises based on elements that contain greater distances and twists.

Another set of exercises that envisages the arm which involves both elbow and the arm or shoulder can be achieved through amplified and adapted exercises (from the above) with specific movements for the new involved elements. Some piano methods present the arm as a single piece so for reaching piano, the arm lean on strong fingers tipped in a position as close to the natural ... Fingers must be firm and articulated well, the weight of the arm (the whole body) transmitted to the finger so as to obtain a feeling that they are walking on the keyboard, such as the legs are walking to the floor (Paladi, 2012). A quality sound is largely based on the weight of the arm left it free from shoulder. (Grigorescu, 2011).

The exercises for the elbow aim to develop arm mobility because any trauma to the elbow can block arm flexion or arm extension.

The intention is therefore to made successive movements pressing simultaneously a group of keys (harmonic intervals, or chords of 3 or 4 notes), gradually increasing the amplitude of the action.

By analyzing their vertical and horizontal movements – looking for lateral inclination – the elbow makes a alternating movement of flexion and extension. By pressing the keys in succession (doing a musical scale) upward and downward over large distances it is envisaged the lateral movement of arm without involving entire movement of the body.

If the whole complex of movements is carried with elbows close to the body, this means that the elbow makes an internal rotation, and if the elbow position is remote from the body, then the elbow makes a horizontal abduction.

Following the correlation between intention and effect, some exercises can be can be developed, through which ample movements of attack is done by pressing certain isolated keys or groups of keys (intervals or chords) in various registers of the keyboard (lower register, medium or high), aiming accuracy of execution through the sound result. By adding successive musical notes upwards or downwards the exercise can increase complexity.

For shoulder traumas, exercises that can be done are those regarding to the position alternation near / away from the piano performing other exercises above (scales, intervals, arpeggios, chords, etc.).

Piano exercises for this type of movement refers to those described above (scales, intervals, arpeggios, chords, etc.) with an execution on large spaces (4-5 octaves) that require lateral movement of the arms but unmoved body position which determines the shoulder to make an internal rotation.

Discussions

During recovery techniques through occupational therapy, artisanal techniques offer a maximum of solution, especially for posttraumatic patients. The main activities used in occupational therapy programs as they are proposed by Sidenco are grouped into various categories:

- Household activities - developing skills for family life;
- Weaving, knitting, crocheting, sewing – a wide range of works that are easy dispensed and appreciated allowing the adaption of tools it can be applied at any stage of treatment; is a basic technique, simplified; allows complete self control of the results, allows adaptations (selective action) and can personalize the treatment;
- Pottery - modeling requires less care; pottery itself is delicate and involves shaping and decorating.
- Fretwork, woodwork – allow adaptability of tools; a wide range of works dispensed and easier to appreciate; is a simplified basic technique; can be applied at any stage of treatment; it provides complete control of the results and allows adaptations; is a selective work and can personalize the treatment.
- Braids are attractive, with limited equipment mainly involves pressing three fingers plus involving the mobility of the wrist, elbow and shoulder without resistance.

Conclusion

The results of occupational therapy in running programs are evaluated depending on the obstacles and limits of every subject, leading to a constant re-evaluation (Sidenco, 2005).

The occupational therapy plays an important role in the recovery of hand after any trauma. Our proposal refers to another kind of activity very enjoyable and with recuperative benefits - playing piano. Like other human activity conscious study of a musical instrument is a job like any other, which leads us to look at is as a psychophysical effort (Răducanu, 2003).

Playing or performing piano, besides being a very enjoyable activity, has a complex character involving an intellectual, emotional, motivational and motric process. The correspondence cause - effect (moving - sound) is dictated by a sensory

primordial request (hearing, in particularly) which is associated with a high psychomotor coordination (Răducanu, 2003). Furthermore, a rapid and effective correction with an immediate adjustment of errors can be achieved, leading in the end to the improvement of all the results.

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