ХІРУРГІЧНА СТОМАТОЛОГІЯ

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USE OF THE SPLINT THERAPY FOR COMPLEX EXTRACTION OF THIRD MOLARS

A clinical observation of patients who underwent splint therapy was conducted: the use of a standard blue T4A orthodontic splint 1 month before surgical intervention and during the post-surgery period for 2 months. ***Materials and methods.*** *Surgical interventions for the complex extraction of third molars were performed in patients with orthodontic pathology and patients with chronic traumatic arthritis of the temporomandibular joint. All extracted teeth were displaced, impacted and caused discomfort to patients during the functional work of the dentofacial apparatus. 26 patients aged from 18 to 35 underwent complex extraction of third molars. The patients were divided into four groups: 1st group consisted of 10 men, 2nd group consisted of 10 women who underwent splint therapy before and after surgery; 3rd and 4th groups consisted of 3 men and 3 women not using splint therapy. All patients were under regular medical check-up for a year. At the same time, a comparative analysis of panoramic radiographs and diagnostic models of the jaws was performed in the studied groups before and 1 hour after the surgical intervention. Prior to surgical intervention 1 month before and after the complex extraction of third molars for 2 months, it was recommended to the patients to use a blue T4A standard orthodontic splint at night.* ***Results.*** *The research findings revealed significant differences in the dentition lengths in the patients under study before and after the complex extraction of third molars, as well as an improvement in their general condition on the part of the temporomandibular joint work. Changes in the occlusal relationships of the teeth of the upper and lower jaws during complex extraction of third molars contribute to the physiological rearrangement of the dental bite and functional changes in the temporomandibular joint work being very important in the treatment of patients with chronic traumatic arthritis of the temporomandibular joint and orthodontic pathology in the form of frontal tooth crowding.* ***Conclusions.*** *The use of splint therapy before and after surgical intervention contributed to more persistent and pronounced functional changes in the work of the dentofacial apparatus, both during visual examination and during digital analysis.*
Key words: *patients, complex extraction of third molars, dentition length, chronic traumatic arthritis of the temporomandibular joint, orthodontic pathology, splint therapy.*

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ЗАСТОСУВАННЯ СПЛІНТ-ТЕРАПІЇ ПРИ КОМПЛЕКСНОМУ ВИДАЛЕННІ ТРЕТІХ МОЛЯРІВ

Проведено клінічне спостереження пацієнтів, яким застосовували сплінт-терапію: використання стандартної ортодонтичної капи Т4А синього кольору за 1 місяць до оперативного втручання та в післяопераційному періоді протягом 2 місяців. ***Матеріали і методи.*** *Оперативні втручання з комплексного видалення третіх молярів проводили пацієнтам з ортодонтичною патологією та пацієнтам з хронічним травматичним артритом скронево-нижньощелепного суглоба. Усі видалені зуби були дистоповані та ретеновані і спричиняли дискомфорт у пацієнтів при функціонуванні зубощелепного апарату. У 26 пацієнтів віком від 18 до 35 років було виконано комплексне видалення третіх молярів. Пацієнтів розподілено на чотири групи: I групу склали 10 чоловіків, II групу – 10 жінок, яким застосовували сплінт-терапію до і після хірургічного втручання; III та IV групи склали 3 чоловіків та 3 жінок без застосування сплінт-терапії. Усі пацієнти перебували на диспансерному обліку протягом року. При цьому проводили порівняльний аналіз панорамних рентгенографій та діагностичних моделей щелеп у досліджуваних групах до і через 1 рік після хірургічного втручання. До хірургічного втручання за 1 місяць і після комплексного видалення третіх молярів протягом 2 місяців пацієнтам рекомендували використовувати в нічний час стандартну ортодонтичну капу Т4А синього кольору.* ***Результати.***

Результати дослідження виявили достовірні відмінності в довжинах зубного ряду у досліджуваних пацієнтів до і після комплексного видалення третіх молярів, а також покращення у них загального стану з боку роботи скронево-нижньощелепного суглоба. Зміна оклюзійних взаємовідношень зубів верхньої та нижньої щелеп при комплексному видаленні третіх молярів сприяє фізіологічній перебудові прикусу та функціональному зміненню роботи скронево-нижньощелепного суглоба, що дуже важливо при лікуванні пацієнтів з хронічним травматичним артритом скронево-нижньощелепного суглоба та ортодонтичною патологією у вигляді скупченості зубів фронтальної ділянки. ***Висновки.*** *Використання сплінт-терапії до і після хірургічного втручання сприяло більш стійким і вираженим функціональним змінам роботи зубощелепного апарату, як при візуальному огляді, так і при цифровому аналізі.*

Ключові слова: *пацієнти, комплексне видалення третіх молярів, довжина зубного ряду, хронічний травматичний артрит скронево-нижньощелепного суглоба, ортодонтична патологія, сплінт-терапія.*

The functions of all elements of the motor masticatory apparatus part are closely related. Dysfunction of one of the elements causes suppression of other functions. There is a well-known orthopedic principle of "unity and suffering" of joints and corresponding muscles. Disorder of the occlusal relationships of the teeth of the upper and lower jaws is the main factor leading to disorders of the dentofacial apparatus. Changes in the dental bite are most often a consequence of the displacement of teeth caused by the occlusion contact loss due to the cariosity, improper fillings, as well as erupting wisdom teeth – third molars [1, 2].

The discrepancy between the sizes of teeth and the alveolar arch adversely affects the dentition structure. If the total mesiodistal size of the teeth exceeds the alveolar arch size, compensatory mechanisms are activated manifesting themselves in a change in the Spee's curve severity and an incorrect inclination of the teeth [2, 4].

The temporomandibular joint disorders (TMJ) rarely occur suddenly, with the exception of acute trauma (blow to the periarticular area, fall on the chin, sharp maximum opening of the mouth). There is a certain dependence of chronic muscle group overload during forced one-sided chewing, pathological bite, partial secondary adentia, long-term eruption of third molars. As a result, muscle hypertrophy occurs on the working side leading to persistent joint dysfunction. The main symptoms in this case may be clicking in the TMJ, jamming when moving the lower jaw, muscle fatigue when chewing, inability to bite, disorder of teeth clenching, arthralgia [3,6].

The weak link and the most common cause of functional imbalance in the temporomandibular joint structures are teeth, dentitions, and neuromuscular apparatus.

The main guarantor of functional balance of the dentofacial apparatus is the close contact between the teeth in the dentitions and, to a large extent, the genetic psychoemotional sphere of the individual [5].

Objectives: to detect changes in the dentition of patients with chronic traumatic arthritis of the temporomandibular joint and frontal teeth crowding during complex extraction of displaced and impacted third molars with the additional use of splint therapy.

Materials and methods of the research. 26 patients aged from 18 to 35 underwent complex extraction of third molars. The patients were divided into four groups: 1st group consisted of 10 men, 2nd group consisted of 10 women who additionally underwent splint therapy; 3rd and 4th groups consisted of 3 men and 3 women not using splint therapy. 30 % of patients were diagnosed with chronic traumatic arthritis of the temporomandibular joint, which arose as a result of a disorder of the occlusal relationships of the teeth of the upper and lower jaws, 70 % were patients with orthodontic pathology: frontal teeth crowding of the upper and lower jaws. Follow-up medical care of patients lasted throughout the year. At the same time, an analysis of panoramic radiographs was carried out, allowing to trace dynamic changes in the dentition after the complex extraction of third molars.

Before surgical manipulations, it was recommended to the patients of the 1st and 2nd group to use a blue T4A orthodontic splint for 1 month.

Extraction of third molars was performed under local conduction anesthesia. The anesthetic used was "Septanest" 1:100 000 (articaine drug). The drug dosage was calculated based on the patients' body weight (5 mg of dry matter per 1 kg of body weight).

During the post-surgery period, the following drug regimen was prescribed, the action of the components of which was aimed at normalizing the body's metabolic processes: Dexamethasone, Dycinone, Ketolong, Furosemide (1 ampoule) were used once in the form of four intramuscular injections immediately after surgical intervention. Nalgesin was used for pain (1 tablet twice a day, after meals with plenty of water). To prevent the inflammatory process and related pathological changes, Suprastin and Mefenamic Acid were used (1 tablet twice a day, for 5 days, after meals, with plenty of water). Mefenamic Acid in combination with Suprastin was used as an interferon secretion stimulator. Cyclo 3 Fort (1 capsule twice a day for 10 days) – to normalize body hemodynamics. The drug has venotonic, lymphotonic and angioprotective properties due to its

composition: dry extract of butcher's broom (Ruscus aculeatus), hesperidin methylchalcone, ascorbic acid. In case of edema, Flamidase was additionally prescribed after 5 days, 1 tablet twice a day after meals with plenty of water and Heparin ointment or gel on the skin twice a day, for 7 days. Oral hygiene was maintained by the standard method of toothbrushing and rinsing with Listerine solution – 1 tablespoon. Listerine + 100 ml of warm boiled water 3–4 times a day, for 7 days.

Ten days after surgical intervention, it was recommended to the patients who underwent splint therapy to resume it for up to 60 days. The T4A orthodontic splint (soft, blue) was used for splint therapy – in the daytime for 2 hours and during sleep.

The T4A dental splint (blue) consists of the following elements: labial arches reducing muscle tone, expanding the jaw and aligning the bite; tongue stop training the tongue to take the upper palatine position; lip bumper contributing the correct occlusion of the jaws and lips when swallowing and at rest, as well as normalizing nasal breathing.

During the splint therapy, it was also recommended to the patients to locally use Dr. Theiss ointment based on comfrey extract in the area of the temporomandibular joints externally twice a day for 20 days. This drug has anti-inflammatory, regenerative, antirheumatic, antioxidant effects, s well as helps to relax the masticatory muscles.

The total recovery period of the patients' body after surgical intervention was 2 months.

The panoramic radiographs were analyzed using the "Planmeca Romexis" program of the "Planmeca ProMax" apparatus allowing to measure the dentition length. The dentition length was measured before and 1 year after the complex extraction of third molars. At the same time, the dentition length was calculated based on the maximum protruding point of the distal crown surface of the twelve-year molar teeth – the second molars on both sides of the upper and lower jaws. Figures 1, 2.

The results of dentition length changes were compared in the study groups.

Results and their discussion. The measurement of dentitions using the "Planmeca Romexis" program allowed to obtained the following results: in the first group, the dentition length of men before extraction of third molars was 80.7 ± 0.32 mm on the upper jaw and 76.5 ± 0.64 mm on the lower jaw; in the second group of women, the dentition length was 80.1 ± 0.32 mm on the upper jaw and 73.2 ± 0.77 mm on the lower jaw. In the 3rd and 4th group, the dentition length before extraction of third molars was 81.1 ± 0.31 mm on the upper jaw and 76.7 ± 0.63 mm on the lower jaw of men; 79.9 ± 0.32 mm on the upper jaw and 73.3 ± 0.75 mm on the lower jaw of women, respectively. At the same time, no reliability of differences was found in the study groups $P > 0.05$.

After the complex extraction of third molars and splint therapy use, the following results were obtained: in the first group of men, the upper dentition length was 87.1 ± 0.98 mm, the lower dentition 83.4 ± 0.69 mm; in the second group of women, the upper dentition length was 85.7 ± 0.39 mm, the lower dentition 78.5 ± 0.57 mm. In the third group, the dentition length of men was 84.2 ± 0.34 mm on the upper jaw and 78.4 ± 0.37 mm on the lower jaw, and 81.5 ± 0.44 mm on the upper jaw and 76.1 ± 0.65 mm on the lower jaw of women (Table 1).

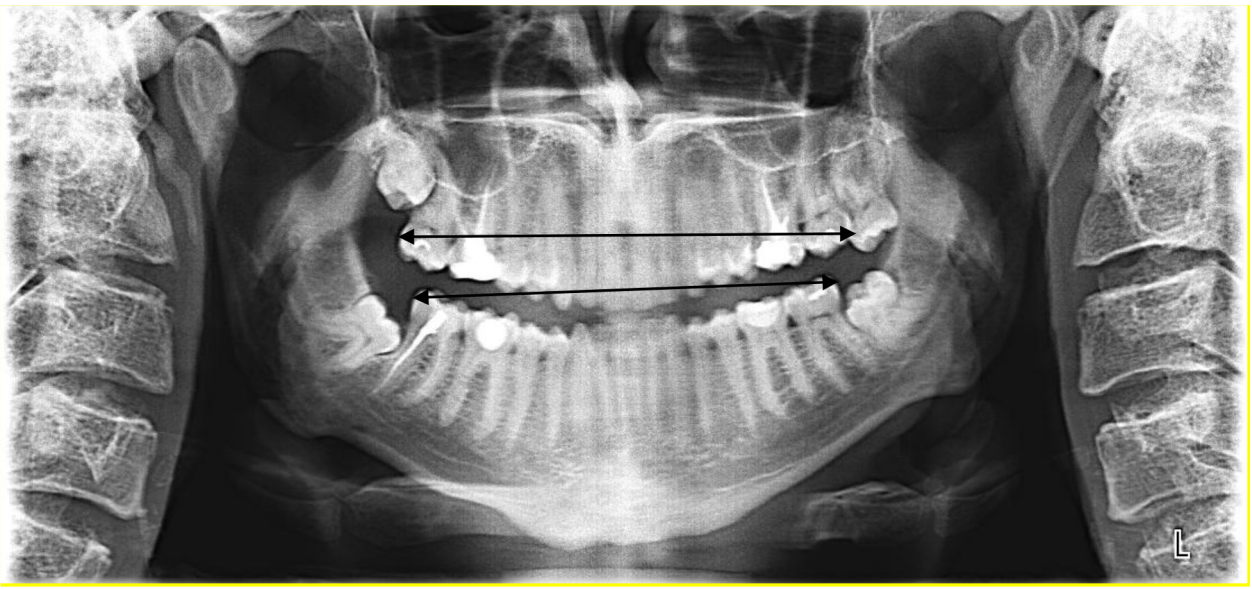

Fig. 1. Patient's dentition before extraction of third molars

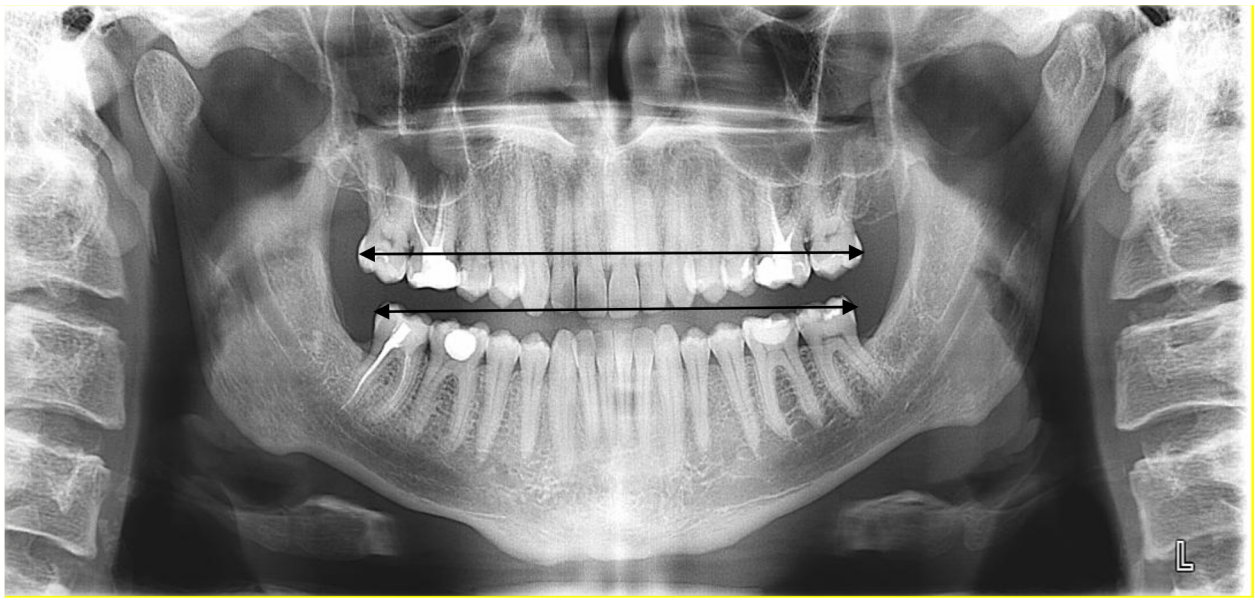

Fig. 2. Patient's dentition after extraction of third molars

Table 1

Dentition length indicators of the upper and lower jaws in the study groups

Groups	Number of persons (*n*)	Dentition length (mm)			
		Before teeth extraction		After complex teeth extraction	
		Upper jaw	Lower jaw	Upper jaw	Lower jaw
I Men	10	80,7 ± 0,32	76,5 ± 0,64	87,1 ± 0,98	83,4 ± 0,69
II Women	10	80,1 ± 0,32	73,2 ± 0,77	85,7 ± 0,39	78,5 ± 0,57
III Men	3	81,1 ± 0,31	76,7 ± 0,63	84,2 ± 0,34	78,4 ± 0,37
IV Women	3	79,9 ± 0,32	73,3 ± 0,75	81,5 ± 0,44	76,1 ± 0,65

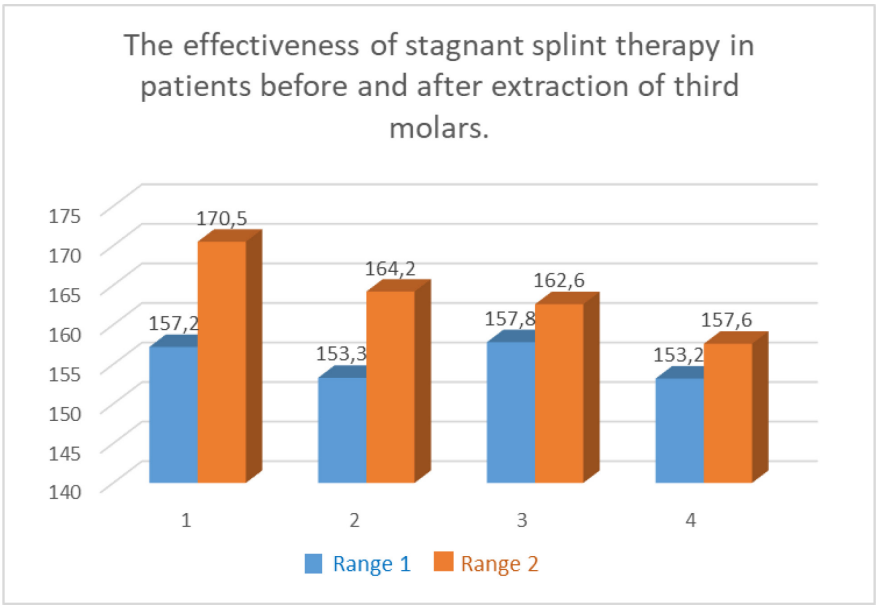

Fig. 3. Range 1 – groups before extraction, range 2 – groups after extraction

The reliability of differences in the groups before and after the extraction of third molars was $P < 0.05$.

The total dentition length before the extraction of third molars of the upper and lower jaws in the first group of men was 157.2 mm, in the second group of women – 153.3 mm, in the third group of men – 157.8 mm, and in the fourth group of women – 153.2 mm. After the extraction of third molars and splint therapy use: in the 1st group – 170.5 mm, in the 2nd group of women – 164.2 mm. In the 3rd group of men without the splint therapy use – 162.6 mm, in the 4th group of women – 157.6 mm. (Fig. 3.)

The difference in the total dentition length of the upper and lower jaws in the groups before and after the complex extraction of third molars was 13.3 mm in the first group of men, 10.9 mm in the second group of women, 4.8 mm in the third group of men, and 4.4 mm in the fourth group of women. Reliable differences in the dentition length of the upper and lower jaws before and after the complex extraction of wisdom teeth were obtained $P < 0.05$.

The effectiveness of changing the dentition length and rearranging the occlusal relationships of teeth of the upper and lower jaws after the complex extraction of third molars and the splint therapy use was 2.8 times in men, and 2.5 times in women.

Complex extraction of third molars contributes to the dentofacial system rearrangement, in particular, there is an increase in the total dentition length of the upper and lower jaws, and this led to a change in the occlusal relationships of teeth of the upper and lower jaws, which in turn changes the load in the temporomandibular joint structures.

Conclusions. 1. Reliable differences ($P < 0.05$) were obtained in the total dentition length of the upper and lower jaws in patients before and after the complex extraction of third molars and the splint therapy use.

2. Complex extraction of third molars contributes to a change in the occlusal relationships in the dentofacial system, uniform distribution of masticating pressure and a decrease in loads on the temporomandibular joint structures due to the physiological rearrangement of the bite.

3. The effectiveness of changing the dentition length and rearranging the occlusal relationships of teeth of the upper and lower jaws after complex extraction of third molars using splint therapy was 2.8 times in men, and 2.5 times in women.

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