tongue direction (43.1%); with parameters of the maxillary dental arch in the sagittal plane - with mesiodistal dimensions of crowns of teeth (50,0%) and with the width of the dentin-enamel border in the mesiodistal and vestibule-tongue direction (55,6%); with parameters of maxillary dental arc in the vertical plane - with teeth length (53.3%), root length in vestibule-tongue (50.0%) and mesiodistal (44.4%) projections and with cephalometric indices (49.5%).

Key words: *youth-mesocephals with orthognatic bite, correlations, transversal volumes of the upper and lower jaw, sagittal characteristics of the dental arch, odontometric indicators, cephalometric indicators.*

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HISTOLOGICAL FEATURES OF MORPHOGENESIS OF REGENERATE IN RATS WITH OPEN LOWER JAW FRACTURE ON THE BACKGROUND OF OSTEOPOROSIS AFTER IMPLANTATION OF CRYOPRESERVED TISSUE OF HUMAN PLACENTS

Summary. *The use of a cryopreserved fragment of the placenta with a combined pathology - a fracture of the lower jaw against the background of osteoporosis - helps to reduce the area of necrosis in the fracture zone, its rapid delimitation, which is accompanied by intensive development of connective tissue. These phenomena are more pronounced in the late stages of repair and are accompanied by an increase in the activity of the osteogenic component.*
Key words: *osteoporosis, fracture, cryopreserved placenta, morphology.*

Introduction

Cranio-facial injury is a serious injuries category and make up a major threat to the health and life of a person what has a great social significance [1, 2, 7]. Among the injuries of the facial skeleton, fractures of the mandible are the most common, which, according to domestic and foreign authors, make up from 70 to 85% of all fractures of the maxillo-facial bones [4, 5, 8, 11].

At present, numerous methods of treatment for stimulation of reparative osteoregeneration after bone fracture have been theoretically substantiated and clinically tested, but there is no consensus among authors on ways to stimulate bone debris consolidation and therapeutic tactics. The question of the use of placental preparations as a method of influencing reparative osteogenesis in the treatment and prevention of complications in trauma and fractures, in particular, with damage to the bones of the facial skull, has not been investigated to date. At the same time, there is evidence of a positive effect of the introduced cryopreserved fragment of the placenta in inflammatory processes, hormonal and immunological failure [6, 9, 10].

Aim of work - to substantiate the possibility of using cryopreserved fragments of the placenta as a corrector of reparative osteogenesis in the experimental traumatic process in the bone tissue of the lower jaw against the background of osteoporosis.

Materials and methods

The study was carried out on 70 male Wistar rats (body weight 180-200 g). Experimental osteoporosis in rats was induced by administration of 2.5% hydrocortisone acetate solution over a period of 60 days in a dose of 5 mg/kg body weight [3]. Subsequently, the drug was discontinued and traumatic damage to the lower jaw was restored: the rat was fixed on the back of the machine; under light hexanal (0.1 ml of 10% solution per 100 g of body weight) anesthesia in the right submandibular zone was performed damage on the skin parallel to the lower edge of the mandible in the medial direction of 10-12 mm in length; the muscles dissected and skeletoned the lower jaw; separating the external cortical plate with a separating disk, and then a full bone fracture with a bit on the line was applied, connecting the site of the fusion of the body and the branches of the jaw in the retro-molar region with a location 0.9 cm from the medial angle of the mandible. The surgical wound was connected with the oral cavity, the muscles and the skin were sutured with a catgut. All stages of experimental research have been performed in accordance with the International Humane Animal Health Practices Directive in accordance with the rules of the "European Convention for the Protection of Vertebrate Animals Used for Experimental

and Other Scientific Purposes" (Strasbourg, 1986) and approved by the Committee on Bioethics of the National Pirogov Memorial Medical University, Vinnytsya (Minutes No. 14 of 25.11.2010).

Animals that were in the same conditions of containment were distributed into the following groups: group 1 - control, animals with combined pathology: rats under the background of the simulated osteoporosis were performed traumatic damage to the mandible (fracture of the mandible); group 2 - study of the effect of cryoplacenta on the repair of bone tissue in animals that had a combined pathology: 24 hours after the manipulation, transplant of the placenta fragments was carried out. The implantation of the drug was performed surgically one day after the fracture of lower jaws. For this purpose, in rats on the back, in the area of the shoulder blade, underneath the local novocaine anesthesia, made a subcutaneous pocket in which a sterile fragment of the placenta weighing 200 mg per animal was fed. The incision was sewn and treated with antiseptics. Human placenta fragments weighing from 1500 to 1800 mg with observance the rules of asepsis and antiseptics were stored in sterile disposable containers of the company "Nunc" for low temperature preservation at a temperature of -1960 C. Cryopreservation and storage of containers was carried out according to the technology developed at the Institute for the problem of cryobiology and cryomedicine of the National Academy of Sciences of Ukraine [9]; group 3 - study of the effect of cryoplacenta in combination with calcium (calcium citrate) in animals that had a combined pathology. The drug calcium citrate was administered to animals once a day in a therapeutic dose of 26 mg/kg, taking into account the coefficient of species sensitivity.

The research was carried out at 7, 14, 21, 30 and 45 days after fracture simulation.

For histological examination, fragments of bone tissue from the operation area were isolated, fixed in 10% of formalin solution, dehydrated and enclosed in celloidin, sections were made on a Reichert sane microtome and stained with hematoxylin and eosin. Studies of histological specimens and microphotography were performed using the "AxioStar Plus" microscope.

Results. Discussion

Group 1. On the 7th day, extensive areas of necrosis were found, and the sequestration of fragments of bone and teeth with narrow granulation tissue zones intensively infiltrated by leukocytes on the border with soft tissues (Figure 1). In some areas, a pronounced lacunar resorption of bone fragments from the side of the granulation tissue was determined. The vast fields of necrosis, subjected to rarefaction and lacunar resorption, are separated from the bone fragments by the granulation shaft.

On the 14th day, randomly located areas of necrosis, sequestration were determined, which were partially delineated by granulation tissue infiltrated by leukocytes, and alternately alternated with irregularly shaped fields from a fine-grained network of bone bunches. At certain sites, sequesters of lamellar bone tissue were identified, which was located among necrosis fields or on the border of necrosis and granulation tissue infiltrated by leukocytes. Sections of the newly formed bone tissue were observed in the thickness of the granulation tissue separating the necrosis fields, in the inter-beam spaces a well-vascularized cell-fibrous tissue was defined in them, at the border of necrosis and granulation tissue.

On the 21st day, various sizes of sequestration were observed among the large areas of necrosis, narrow fields of the granulation tissue alternated with large zones of pronounced leukocyte infiltration. Lacunar resorption with strata of newly formed bone tissue was determined on individual sites, mainly at the ends of fragments of the lamellar bone, along the periosteal and endosteal surfaces, diffuse and focal leukocyte infiltration of the granulation tissue.

On the 30th day, randomly spaced sections of necrosis were identified, with sequesters of various sizes and granulation tissues, sometimes with intensely marked infiltration. The newly formed bone tissue was located mainly on the periphery. In some areas, pronounced lacunar resorption and zones of osteogenesis in the region of fragments were detected. Among the granulation tissue were randomly located areas of necrosis, sequestration and a small-loop network of newly formed bone beads, mostly in the form of bezystocitous sequesters, osteocytes were surrounded by lacunae with fuzzy contours. Individual cells were small, contained dense nuclei and were located in dilated lacunae with basophilic margins, which indicated a violation of mineralization and calcification of lacunar walls, which indicates osteoporotic processes.

At day 45, sequestration and necrosis occupied mainly the central areas and were separated by a narrow zone of infiltrated granulation tissue with fistulous passage. The fields of the newly formed bone tissue are found outside the granulation, forming not a continuous secondary bone "box". In some areas, sequestration is partially fused to the bony beams of the newly formed shallow loop, locally restricted by leukocyte infiltrated granulation tissue from the fields of the newly formed bone (Figure 2). Bone trabeculae were found in the central sections with microcracks and also sections of the basophilic matrix, which reflects a violation of mineralization processes, which can be regarded as manifestations of osteoporosis.

Thus, in animals of group 1 against the background of sharply expressed osteoporosis between 21 and 30 days, the regeneration of the injured lower jaw was characterized by pronounced necrosis and sequestration processes with the phenomena of primary and secondary necrosis. Typical for this process was a pronounced tissue infiltration, which consistently increased from 14 to 21 days. Despite a significant amount of necrotic changes, sequestration and infiltration of leukocytes, the granulation tissue formed by 45 days completely delimited the necrosis and sequestration zones, and beyond it a secondary bone "box" was formed

Figure 1. Fragments of bone fragments of the mandible on the right on day 7 after an open fracture on the background of osteoporosis. 1 - lacunar resorption of bone fragments; 2 - granulation tissue, focal infiltrated with leukocytes. Hematoxylin-eosin. Magnification 150.

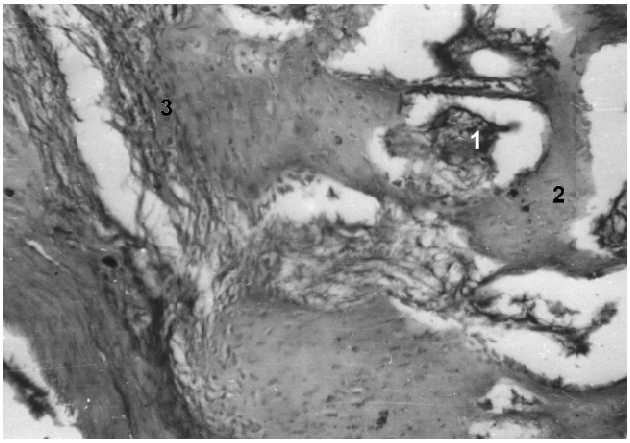

Figure 2. Fragments of the fractures of the lower jaw bones on the right for 45 days after an open fracture against an osteoporosis background. 1 - sequestered fragments of lamellar bone tissue; 2 - a network of newly formed bone plates; 3 - granulation tissue, infiltrated with leukocytes. Hematoxylin-eosin. Magnification 150.

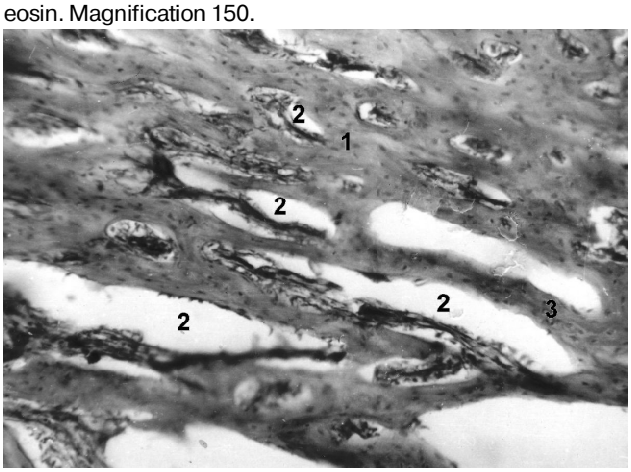

Figure 3. Fragments of the fractures of the lower jaw bones in the right-hand side of the rats with a model of open fracture of the mandible on the background of osteoporosis after implantation of cryopreserved placenta 7 days after the fracture. 1 - the surface of the fragment of the plates bone; 2 - areas of lacunar resorption; 3 - a network of newly formed bone plates. Hematoxylin-eosin. Magnification 150.

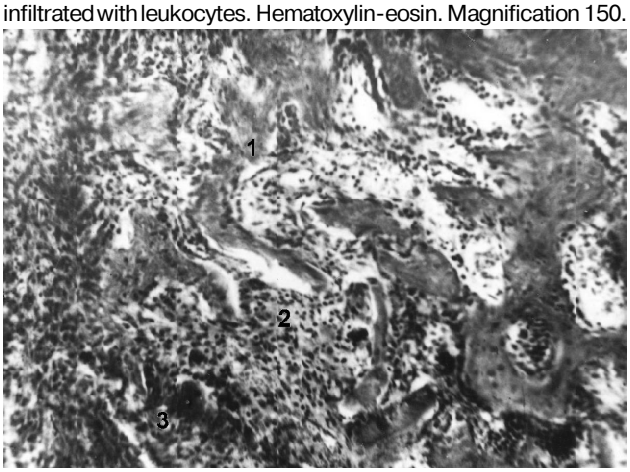

Figure 4. Fragments of the fractures of the lower jaw bones on the right in the rat with a model of open fracture of the mandible on the background of osteoporosis after implantation of cryopreserved placenta 45 days after the fracture. 1 - newly formed bone plates; 2 - narrow zone of granulation tissue; 3 - the area of necrosis. Hematoxylin-eosin. Magnification 150.

from the small and large-pile network of newly formed bone bunches.

Group 2. On the 7th day, extensive areas of necrosis and sequestration were identified, which were located at a considerable distance from the injury line but were delineated by a well-formed granulation tissue with narrow sections of leukocyte infiltration. In some areas (Figure 3) fragments of compact bone tissue were determined, in which along with clearly colored osteocytes, "voids" or chambers with asymmetrically located or partially fragmented osteocytes were found. The surface of bone fragments with a large number of resorption lacunae in many areas was fused to newly formed bone bunches that locally formed the fields or passed into areas of osteogenic granulation tissue in which a significant number of cells with an asymmetrically located nucleus, intensively oxyphilic homogeneous cytoplasm, to preosteoblast. Often between these cells, thin branched areas of the newly formed bone matrix were found.

On the 14th day, the predominance of the fields of granulation and newly formed bone tissue was found in the components of the regenerate, which clearly delimited the necrosis and sequestration sites and only in certain regions was infiltrated by leukocytes in the form of narrow zones. In certain zones, the delineation of necrosis sites was determined by granulation tissue containing a large number of capillaries. Against the background of a large number of newly formed bone bunches, mainly soldered to the surface of the fragments, there were areas of compact bone tissue with separate non-stestocytic zones and places of resorption lacunae.

On the 21st day, necrosis and sequestration sites were detected. They occupied the central regions of the regenerate

and were delimited by a well-formed tissue that was infiltrated by leukocytes in places of contact with the necrosis zones. In close connection with the damaged sections of the fragments, the fields of a small- and large-pile network of bone bobs were determined. In some areas there was a transition of granulation tissue into the field-like fields of newly formed bone bunches, which were reconstructed into compact zones. In other areas, the formation of a cortical structure of thickened bone bones was found, delimited by a fibrous layer from the granulation tissue.

On day 30 maintained regenerate arrangement of components described above: small areas of necrosis and sequesters the center, a relatively narrow band of granulation tissue surrounding these regions and only in some parts of its leukocytic infiltration. The main component of the regenerate was the newly formed bone tissue, into which the remaining fragments of bone tissue were "soldered". In some places, the osteoclastic resorption of compact bone at the ends of the fragments and the fusion of the newly formed bone tissue with the surface of the same fragments was determined. The fields of the newly formed bone bunches passed into the granulation tissue, which in the layers adjacent to the necrosis site was infiltrated by leukocytes. Due to the fields of bone bunches, the ends of the fragments are fused, but in places they are separated by a granulation tissue with a distinct fibrous base.

At day 45, the pattern described above remains. The location of the main components of the regenerate did not differ significantly. Most of the fields consisted of thickened newly formed bone bunches, which form a coarse-woven network, which was locally rearranged into compact bone tissue. In some areas (Figure 4), the delineation of the fields of newly formed bone bobs from the granulation tissue was clearly detected, which narrowed the area of necrosis by a narrow zone. The preserved fragments of compact bone are welded to the newly formed bone tissue. Lacunar resorption is found in the region of the ends of the fragments.

The data presented clearly reflect the stimulating effect of the injected cryoplacental preparation, expressed to a greater extent in the late stages of regeneration. The predominance of the activity of the osteogenic component in the fusion of fragments of damaged bone through a network of finely bony bone beams, which consists in an increase in the area of the newly formed bone tissue in the lesion zone compared with the control group. In addition, the cryoplacental preparation had a stimulating effect on the formation of provisional tissues in certain regions of the regenerate in the early periods from 14 to 21 days.

Conclusions and perspectives of further development

1. In the control group (group 1) granulation tissue was the most active component of the regenerate in all terms of its formation and leukocyte infiltration delimited fields and sequesters, but has not received an osteogenic component predominant development and consequently to the final observation period recovery of the mandible integrity is not occurred, because in the morphogenesis of the regenerate there was no regular change in structure, which slowed down the process of restructuring.

2. At the turn of the introduction of cryopreserved placenta (group 2) was defined considerably smaller than in the group 1, the intensity of necrotic changes, the rapid necrosis delimitation portions and sequesters and more intensive development of granulation tissue. This created the conditions for the fusion of the fragments to the 30th day due to the shallow-loop network of newly formed bone bunches.

The results obtained in the experiment allow to determine the indications for the combined use of cryopreserved tissue placenta in the complex treatment of patients with disorders of reparative osteogenesis.

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Ліхіцький О.О.

ГІСТОЛОГІЧНІ ОСОБЛИВОСТІ МОРФОГЕНЕЗУ РЕГЕНЕРАТУ У ЩУРІВ З ВІДКРИТИМ ПЕРЕЛОМОМ НИЖНЬОЇ ЩЕЛЕПИ НА ТЛІ ОСТЕОПОРОЗУ, ПІСЛЯ ІМПЛАНТАЦІЇ КРІОКОНСЕРВОВАНОЇ ТКАНИНИ ПЛАЦЕНТИ ЛЮДИНИ

Резюме. *Використання кріоконсервованого фрагмента плаценти при поєднаій патології - переломі нижньої щелепи на тлі остеопорозу - сприяє зменшенню області некрозу в зоні перелому, швидкому його відмежуванню, що супроводжується інтенсивним розвитком сполучної тканини. Ці явища більш виражені на пізніх стадіях репарації і супроводжуються підвищенням активності остеогенного компонента.*

Ключові слова: *остеопороз, перелом, кріоконсервована плацента, морфологія.*

Лихицкий А.А.

ГИСТОЛОГИЧЕСКИЕ ОСОБЕННОСТИ МОРФОГЕНЕЗА РЕГЕНЕРАТА У КРЫС С ОТКРЫТЫМ ПЕРЕЛОМОМ НИЖНЕЙ ЧЕЛЮСТИ НА ФОНЕ ОСТЕОПОРОЗА, ПОСЛЕ ИМПЛАНТАЦИИ КРИОКОНСЕРВИРОВАННОЙ ТКАНИ ПЛАЦЕНТЫ ЧЕЛОВЕКА

Резюме. *Использование криоконсервированного фрагмента плаценты при сочетанной патологии - переломе нижней челюсти на фоне остеопороза - способствует уменьшению области некроза в зоне перелома, быстрому его отграничению, что сопровождается интенсивным развитием соединительной ткани. Эти явления более выражены на поздних стадиях репарации и сопровождаются повышением активности остеогенного компонента.*

Ключевые слова: *остеопороз, перелом, криоконсервированная плацента, морфология.*

Reviewer - prof. Gunas I.V.

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ДИСКРИМІНАНТНІ МОДЕЛІ ПРИНАЛЕЖНОСТІ ПРАКТИЧНО ЗДОРОВИХ ЧОЛОВІКІВ ДО ЦЕНТРАЛЬНОГО, ЗАХІДНОГО АБО СХІДНОГО АДМІНІСТРАТИВНО-ТЕРИТОРІАЛЬНИХ РЕГІОНІВ УКРАЇНИ НА ОСНОВІ ОСОБЛИВОСТЕЙ ПОКАЗНИКІВ ПАЛЬЦЕВОЇ І ДОЛОННОЇ ДЕРМАТОГЛІФІКИ

Резюме. *В статті, на основі особливостей показників пальцевої і долонної дерматогліфіки, побудовані і проведено аналіз достовірних дискримінантних моделей приналежності практично здорових чоловіків до центрального, західного або східного адміністративно-територіальних регіонів України. В більшості випадків сукупність усіх дерматогліфічних змінних мають незначний рівень дискримінації (найвищий рівень встановлено між чоловіками західного і східного регіонів України). Найбільш часто дискримінантними змінними між чоловіками даних регіонів України є тип візерунку на пальцях лівої кисті.*

Ключові слова: *дерматогліфіка, адміністративно-територіальні регіони України, дискримінантний аналіз, практично здорові чоловіки.*

Вступ

Сучасний склад населення України є результатом складних багатовікових процесів міграцій народів, етнічних груп, що проживали на її та суміжних з нею територіях. Більше того, станом на даний час (рубіж 20 та 21 століть, початок 21 століття) цей процес активно продовжується в силу різноманітних макрофакторів [13].

Такі виклики сьогодення як війни, різкі зміни соціально-економічного стану країн (відповідно рівня життя населення і рівень злочинності) вимагають створення все нових методів, що дозволять так чи інакше ідентифікувати расову, етнічну, і навіть регіональну приналежність особи, використовуючи при цьому легкодоступний, простий у використанні метод дослідження, що базувався б на дослідженні людської ознаки, що має бути "відображенням" столітніх процесів змін в етногенетиці. Антропологічні маркери дозволяють реконструювати, відновити процеси давнини, оминаючи такі недостовірні ознаки як лінгвістичні та культурні, що не підлягають оцінці у зв'язку з сучасним рівнем руху та урбанізації населення. Одним з таких маркерів, безсумнівно, слід вважати шкірний рельєф людини, вивченням якого займається така наука як дерматогліфіка [14]. Більшість авторів [5, 7, 10, 12, 13] схиляються до того, що дерматогліфічні ознаки можна і необхідно вико-