and polished to remove surface stress, and cleaned before implantation. Implantation was then performed subcutaneously above the mouse spine. Implants were retrieved after up to 6 months. Retrieved implants were observed directly and also under scanning electron microscope.

Result and discussion

No significant health effect was observed in the mice, except occasional diarrhoea (discussed elsewhere [2]). No pathological change could be observed at the site of implantation. When special attention was paid to the corroded alloy surface created by the implantation, however, interesting observations were found.

The presence of gas bubbles was not unexpected, as:

$$Mg(s)+2H_2O(l) \rightarrow Mg(OH)_2(aq/s)+H_2(g)$$

When magnesium alloys were carefully removed from the mouse body after subcutaneous implantation, the implants were found covered with fibrous tissues, and peri-implant gas bubbles were often observed when the implants were observed directly, while more micro-sized bubbles could be observed when the implant was placed inside the vacuum environment of a scanning electron microscope, indicating the presence of microscopic gas bubbles. For 99.95% magnesium which corroded much faster than other alloys, after the fibrous layer was removed, corrosion was clearly found to be much more severe under the gas bubbles (FIG.2).

Despite differential corrosion should indeed be anticipated when different parts of a piece of metal are in contact with differential environments, this knowledge was not discussed, or was indeed forgotten, by most investigators in this field of study. As indicated by our animal study, 6 months could be insufficient for the “gradual” dissolution to complete, at least in some applications. This study, which suggested that the presence of gas bubbles must be taken into account when considering the corrosion of degradable metallic implants, had therefore shed new insight into the field of study.

This blinding flash of the obvious was indeed an immediate invalidation of the current simple corrosion studies on this class of biomaterial. A single-phase immersion testing would simply be unable to simulate the differential environment on the alloy surface, covered by body fluid, fibrous tissue or other body tissues; plus the instantaneous or more persistent presence of gas bubble, inavoidably created by the corrosion of magnesium and trapped around the implant.

Conclusion

We have identified from pure magnesium samples that in vivo corrosion of degradable metallic implants could be much more rapid under the gas bubbles surrounding the implants. As an in vivo magnesium-based implant would unavoidably face a differential environment in the body with gas bubbles, it is highly suggestive that the relevance between the result of simple single-phase liquid immersion testing and the in vivo corrosion profile of degradable metallic implants cannot be high, because a simulation of the gas bubbles and surrounding fibrous tissues, which have significant effects on the corrosion profile, were simply lacking.

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CHARACTERISTICS OF THE MAXILLA BONE TISSUE REGENERATION WHEN POROUS GLASS-CERAMIC MATERIAL «BYOSSITAL» APPLIED IN COMPLEX WITH ACUPUNCTURE. EXPERIMENTAL CASE

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Introduction

Maxillofacial surgeons meet in every day practice the problem of the maxilla bone restoration after the tumors, tumor masses removal in traumatic injuries of the maxilla bones.

Information of the last two decades confirms that non-cancerous growth and maxilla cysts make 25 % of the total quantity of the surgical diseases. Immediate and late results of the treatment for patients with mentioned above diseases remain unsatisfactory up till now [1,2].

Application of different types of transplants for maxilla defects restoration is not every time possible for a maxillofacial surgeon and functional and aesthetic results are not satisfied sometimes. 10% of negative results of the implants technologies [4] application are due to the common resistance of the human body often determined by functional disorders of different levels of the homeostasis. Acupuncture potential attract attention of specialist more and more because it can provide required level of the human body homeostasis regulation and functioning autonomously, without any therapeutical stimulation from outside.

Aim of the work was to study the characteristics of the maxilla bone tissue regeneration when porous glass-ceramic material of «Byossital» applied with acupuncture in the experiment.

Materials and methods

We performed the examination on the 8 outbred dogs according to the «Regulations for the work with experimental animals» approved the MSMU Board on the 24.04.1996 and requirements regulating the experimental animals use. Standards of American Heart Association`s «Guidelines for the Use of Animal in Reserch» и Guide for the core and Use of Laboratory Animals (National Academy Press, Revised, 1996) [3,5] were used when invasive procedures were applied.

We cut the skin and tissues under it under the intravenous anesthesia in aseptic conditions. Then, pereosteotomy was made with further bone tissue skeletonization in the region of the horizontal segment of the lower jaw where the injury of 20x15 mm was done. The neurovascular fascicle was

kept undamaged. The artificially made defect of the bone was filled in with the modeled implant in the form of block of «Byossital» material providing its firm adherence to the injury sides. The sutures were cleansed with 1% alcohol solution of iodine. Animals were treated with antibiotics of the piniciline group on the basis of 500 Units per one kg of the animal weight in order to provide the prophylaxis measures for pyoinflammatory complications.

The acupoint similar to the GI4 was irritated with the strong brake method every day during 10 days. Acupuncture needle exposure made 30–40 minutes.

In order to provide the materials sampling for histological examination, the experimental animals were removed from the experiment with thiopental OverDose according to the following terms: 14, 21, 28 days and 6 months. The macrospecimens were fixed in the 10% neutral formalin and they were decalcificated by the nitric acid and placed into the paraffin. The mounts were pained with hematoxylin-eosin and by Van-Gison.

Results

The reclaim consisted of the specific young osteogenous tissue with formation of the bone tissue trabecules growing to the corner parts of the pores was formed by the 14 days around the inserted the implant.

21 days later, the specific osteogenous tissue surrounding the implant and separating its with taenias continues formation. The main weight of the specimen was lost during its processing with the nitric acid. Expressed regeneration of the bone tissue was fixed. Trabecular structures with directed growth to the implant side were formed. At the place of the dissolved parts of «Byossital» we fixed the free cavities, ingrowing girder of the bone tissue and surrounding free parts formed due to the dissolved implant had mature form.

By the 28 day the microscopic picture was similar than by the 21 day and osteogenic structures continues growing.

6 month later implanted materials had the form of small rounded conglomerates which were surrounded with new mature bone tissue. Interfaces with the injury were not found. At the same terms the regenerated bone tissue surrounding the implant had clear specific trabecular bone tissue structure. It was not possible to fix deep invasion of the bone tissue trabecules into the implant pores. But the much deeper invasion of the connecting fibers without signs of the osteogenesis was fixed.

The traces of the graft rejection (bone tissue necrosis, inflammation reaction, cells of the foreign body) were not fixed during all terms of examinations as from the side of the bone tissue as well as from the soft tissues surrounding the implant.

Conclusion

Described below glass-ceramic material «Byossital» that we applied for reconstruction of the bone tissue injuries has high level of the biocompatibility and its complex application with acupuncture provides adequate osteointegration with the bone tissue of the recipient. So, the offered complex of treatment becomes more perspective in restoration of the bone tissue defects of the maxilla.

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METHOD OF THE PYOINFLAMMATORY COMPLICATIONS PREVENTION IN TRAUMATIC INJURIES OF THE INFERIOR ALVEOLAR NERVE OF TOXIC GENESIS. EXPERIMENTAL CASE

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Introduction

It is obvious that the fractures of the lower jaw accompanied with injuries of the inferior alveolar nerve are complicated with osteomyelitis in most of cases [1]. According to the G.I. Sementchenko's theory (1958) pathogenesis of the maxilla osteomyelitis should be considered as neutrophilic process [5]. During long irritation of the peripheral nerves, the trophism of the bone tissue is deranged what provokes formation of the necrosis focuses. Furthermore, the pathological impulses come continuously in the cerebral cortex from the focuses of the permanent irritation of the