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Application Tissue Engineering in the Treatment of Temporomandibular Disorders

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ABSTRACT

The aim of this study was to examine the articles of the new use of engineered tissues in the treatment of problems joint temporomandibular jaw can be.

Materials and methods: In order to carry out this study, a review of all articles source books Medline (PubMed) and Google scholar with a focus on the issue of the use of engineered tissues in the temporomandibular disorders in the period of time 1990 to 2018 about the search and investigate supposed to be.

Results: Using the approach of engineered tissue for the different treatment of defects of temporomandibular joint disorders can be helpful is that to them out of there. Ability to build cartilage similar to cartilage naturally by way of a new provision has been. Also, to help gene therapy, cell therapy, reconstruction defect of osteochondral, Ramus even part of the condyle of the left with the ability to comply with part of the left and doing function properly with the remaining part of the use of cells from stem mesenchymal (MSCs). There are factors of growth and cytokine are and provide a scaffold made of polymeric bio-compatible and industries can be differentiated cells from stem mesenchymal to cells of chondrocytes and osteoblasts to cause it. Although they are tried on this is that more regeneration of muscle - Skeletal with the use of the technology and rehabilitation of cells to patients without using scaffolds.

Keywords: Tissue engineering, Stem cell, Temporomandibular disorder

Abbreviation: TMD: Temporomandibular Disorder; MSC: Mesenchymal Stem Cell

INTRODUCTION

Temporomandibular joint, it is a joint with bilateral articular surfaces consisting of the condylar mandible and glenoid fossa of the temporal bone. It is strengthened, it is surrounded. Intermediate between condyle mandible and temporal bone fossa, articular disc fibrocartilage it is connected to the bones and capsules by the parasite. And the joint space is incomplete in two parts, the upper or lower cavity and the cavity or cavities temporo disc - condyle, divides [1]. Over 50-40% of the world's population suffers from various joint pathologies, including jaw joint involvement [2,3], which requires medical intervention by various specialists in various fields of medicine. And this shows an increasing psychological and social defect [4]. Symptoms temporomandibular disorder (TMD) the peak age of 20- 40 years is often characterized by a lower prevalence in younger and older people [5] and a higher gender orientation in women with painful and depressive situations [6]. Non-invasive treatments include medications, orthodontics, physiotherapy and acupuncture. Medications used by painkillers include: NSAIDs, Anti-anxiety, muscle relaxants and opioid. Orthodontic treatments and occlusal splints are widely used for treatment [7,8]. Traditionally, the main elements of tissue engineering are based on reconstruction strategies and include scaffolding, cells and biological stimulation. 2 methods are used in cartilage and bone engineering. Tissue Engineering *in-suite* it uses a scaffold matrix without cells to absorb and stabilize cells on it and performs the regeneration process. And another way ex-vivo where the cells are placed on the scaffold from the beginning [9]. On the other hand, scaffolds are buried with growth factors to induce faster extracellular matrix synthesis. Intra-articular injection of cells or topical delivery of biologically active molecules can also be used as a

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strategy. It should be noted that scaffolds used in tissue engineering must be able to differentiate precursor cells from chondrocytes and extracellular cartilage material.

Another strategy is to stimulate mesenchymal stem cells residing in the synovial layer [10]. Mesenchymal stem cells can secrete growth factors, cytokines, and chemokines that play a biologically impaired role [11,12]. These key growth factors include: bFGF IGF-1, TGF- β, fibro chondrocytes from mandibular condyle are less responsive to IGF-1 than hyaline chondrocytes [13].

METHOD & MATERIALS

This review study, all articles in the electronic source Medline (PubMed), Google scholar with a focus on the use of tissue engineering in the treatment of temporomandibular joint disease - jaw in the period between 1990-2018 to be searched and examined.

Inclusion criteria: review articles that have been mentioned in the period in which clinical trials are focused on tissue engineering and cell therapy applications in the treatment of temporal joint problems

Jaw was paid. It should be noted that age and sexual modality were not important in these studies and different cell therapy-based processes were included in the selection of articles [14].

Exclusion criteria: All articles that were in a non-English language in previous years or did not meet our criteria were removed from the study.

RESULTS

The results of this review show that mesenchymal stem cells derived from synovium, bone marrow, umbilical cord, etc. can be differentiated into scaffolded beds or scaffold-free approaches, as well as in the presence of growth factors. They have chondrocytes and osteoblasts and can be shaped *in-vitro* and use biocompatible or industrial polymers that can encapsulate the condyle to rebuild the temporomandibular joint. What is worth mentioning, the word is that the use of cell L stem cells and growth factors and nutritional environments, it may be in the process of degenerative and inflammatory diseases such as osteoarthritis, degenerative joint reduce or stop. Without disrupting the process of joint proliferation [15]. The results of the studies also show that the use of scaffolding during the weaving engineering process with problems such as complex and precise preparation technique, attention to the speed of scaffolding decomposition, size and shape of pores in it, mechanical properties and power. Tolerating physical stress has been associated with it, so today we are trying to use new methods of tissue engineering to increase the self-sufficiency power of stem cells in the site of injury and the ability to mimic them from healthy adult cells in the environment and provide Proper nutrition and growth factors, the ground for replacing the scaffold-free approach with tools with Pro features Get the tip faster [16].

DISCUSSION

Temporomandibular joint disease has always been one of the most annoying types of joint disease and maxillofacial disease. Existence of dull pains and lack of full ability to chew, night and morning pains and increasing need to take various painkillers, has doubled the need to treat this disease. Although the presence of conservative therapies such as analgesics, occlusal night guard splints, heat therapy, etc. can be considered as the first line of treatment and it goes without saying that it treats a wide range of patients, but there are advanced joint problems such as osteoarthritis, disease Joint degenerative tumors and tumors and joint ankylosis will require more invasive treatments.

Conventional joint surgeries, including joint replacements and spasms, will be associated with serious complications, including disability, risk of treatment failure, and neurovascular problems. But performing new stem cell therapies, in addition to reducing morbidity, will guarantee greater success. However, the high cost of treatment, the need for trained people and the availability of laboratory equipment will be limitations of this method.

CONCLUSION

As a result of this study, the review showed that gives the engineered tissue can be replaced by the old treatment of joint TMJ And rebuild it be, that benefits such as reducing damage to places of and reduce the risk of post- tagging links to it. This doubles the importance of stem cells as an essential component of this technique.

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