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OPTIMIZATION OF OPERATIONS ON MAXILLA SINUS WITH THE APPLICATION OF ENDOSCOPIC TECHNOLOGY WITH DENTAL IMPLANTATION

Dental Science

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ABSTRACT

Background: The posterior region of the edentulous maxilla often presents insufficient bone quantity and quality for prosthetic rehabilitation with endosseous implants. The sinus lift procedure is one of the primary surgical options allowing placement of dental implants in the posterior maxilla. However, the procedure may be complicated in patients with chronic maxillary sinusitis.

Aim and Objectives: Optimization of the sinus-lifting in the pathology of the maxillary sinus by a one-stage endonasal endoscopic elimination of the sinus pathology and carrying out a sinus-lifting.

Materials and methods: A total of 18 patients with ridge defects were selected for the study. The technique of of simultaneous endonasal sanitation of the maxillary sinus, endoscopically assisted sinus-lifting, dental implantation, was used in 12 patients.

Results: The method of simultaneous endonasal sanitation of the maxillary sinus, endoscopically assisted sinus-lifting, dental implantation, allows to reduce the probability of perforation of the membrane, significantly shortening the rehabilitation period of patients with insufficient bone tissue in the maxillary sinus.

KEYWORDS

endoscopic sinus-lifting , dental implants

Introdutction

Dental implants are now commonly used for replacing missing teeth in various clinical situations. However, due to atrophy or periodontal disease, local conditions of edentulous ridges may be unfavorable for implant placement.

Through the years, multiple procedures and augmentation materials have emerged to augment deficient bony ridges. The bone augmentation procedures used in implant dentistry includes, graft reconstruction, GBR, maxillary sinus floor elevation, and alveolar distraction osteogenesis. To date, there is no conclusive evidence in the literature on the superiority of one technique over the others in terms of prosthetic or implant success. The decision to opt for either of the options, therefore, depends upon patient factors, and ultimately, the expertise and skill of the clinician.

The sinus lift procedure is a technique of bone reconstruction of the depleted maxillary sinus floor. It is one of the primary surgical options allowing placement of dental implants in the posterior maxilla[1,2,3].

The traditional technique consists in a modified Caldwell–Luc approach, where access to maxillary sinus is obtained by drilling a bone window in lateral sinus wall; then, Schneiderian membrane is carefully detached and elevated from sinus floor in order to insert grafting materials, including autogenous bone, allografts, xenografts, or alloplasts. Implants can be inserted simultaneously, or in a second stage if residual bone is not sufficient to obtain an adequate primary stability. Contraindications may include a history of chronic or recurrent sinusitis,chronic nasal obstruction, chronic hyposmia and/or hypogeusia, previous treatment for head and neck neoplasms. A sinus infection can directly affect the success of the sinus-lifting procedure.

The key-factor for success of sinus lift surgeries is the atraumatic detachment of the periosteum of the maxillary sinus membrane from the bony antrum-floor comparable to the preparation of a mucoperiosteal flap or subperiostal tunnel in order to provide a reliable osseointegration of and bone regeneration around the grafting material, which can only take place with a fully intact periosteum.

Sinus floor augmentation with autogenus bone grafts or with biomaterials has since long been the predominant, well-documented procedure in the literature[4,5,6,7]. However, the procedure may be complicated in patients with chronic maxillary sinusitis[8,9,10].

Modern tendencies of dental implantation are aimed at minimizing surgical trauma and reducing the time for rehabilitation of patients. In this connection, new implant technologies without bone plastic are becoming widespread, which allow to reduce the volume and quantity of surgical interventions and shorten the time of treatment.

Revision sinus surgery for inflammatory diseases of maxillary sinus has been revolutionized by endoscopic techniques used in maxillary sinus surgery[11,12]. Endoscopically technique involves transalveolar mobilization of the sinus membrane controlled by endoscopy. This technique is indicated for moderately reduced alveolar sites. Through this approach, a “tenting” of the complete sinus membrane from the premolar to the second molar site could be performed, thus allowing for large augmentations in case of primary and secondary implantation.

However, need for expensive equipment and prolonged time of surgery are the factors that have to be considered when discussing this issue. Also, regarding minimally invasive lateral window augmentation, prospective study comparing this technique to the traditional surgical procedure will be necessary before its clinical use can be recommended.

Aim and Objectives: Optimization of the sinus-lifting in the pathology of the maxillary sinus by a one-stage endonasal endoscopic elimination of the sinus pathology and carrying out a sinus-lifting.

Materials amd methods: A total of 18 patients (10 males and 8 females, the age was 28 to 62 years, from 2014 to 2017) with ridge defects in age group were selected for the study. All patients had a partially or totally edentulous severely atrophied posterior maxilla. All patients underwent a thorough clinical examination according to a generally accepted scheme.

Preoperative planning includes a careful history and physical exam, in addition to preoperative radiologic investigation, which could include orthopantomogram and/or a computed tomography scan to evaluate for and rule out any contraindication to the sinus lift procedure. Computed tomography were obtained to determine the existing osseos structure and to evaluate any pathology of the sinuses. Treatment initiates with the administration of a single preoperative dose of systemic antibiotic (Amoxicillin, clindamycin or levaquin) and Chlorhexidine 0.12 percent rinse.

A total of 23 sinus lifting procedures were performed, using a mixture of bovine bone, autogenous bone and PRP.

To conduct a comparative analysis of the results, two groups were formed:

-basic group of 12 patients who had endonasal interventions on the maxillary sinus performed simultaneously with sinus-lifting.

-control group of 6 patients who had endonasal interventions on the maxillary sinus for 2-3 months. before sinus-lifting.

In 4 patients of the basic group, polyposive sinusitis, 3 - foreign body of the maxillary sinus (filling material) with sinusitis, 5 - chronic hypertrophic sinusitis was detected.

In 2 patients of the control group, polyposive sinusitis, 1 - foreign body of the maxillary sinus with sinusitis, 3 - chronic hypertrophic sinusitis was detected.

For sinus surgery, used endoscope is 4.0 mm diameter rigid endoscope (Karl Storz). It provides different angles ofvision in maxillary sinus from 0° to 30°.

According to our surgical procedure we performed in our patients 1 a 2 stage sinus lifting, 82 Ankylos implants(Dentsply Implants) were inserted. The delayed establishment of dental implants was carried out in 3 patients of the main group after 5 months after operation.

Postoperative outcomes; infection, radio-density, resorption and failure of bone grafts were checked clinically and radiographically. The height of the graft and bone density was measured 6th and 9th month after surgery using serial orthopantomograms and CT scan. Dental prosthetic rehabilitation was undertaken 5 months after implants insertion and submerged healing. The implant success was controlled clinically and radiographically. Criteria for failure included implant mobility (> 1 mm), radiographic bone loss (> 1/3 implant height). All patients signed an informed consent for surgery and participation in scientific studies.

Results:

In 12 patients of the basic group, perforation of the mucous base of the maxillary sinus did not occur in the performance of sinus-lifting in any case. In the control group, in 3 patients, 1-2 mm thick mucosal perforation occurred, which was closed with a platelet rich platelet and a resorptible membrane.

In the basic group, on the first day after surgical treatment, patients were troubled by pain in the operation area, difficulty in nasal breathing, and bloody discharge from the nose. On 2-3 days after the operation, minor swelling in the buccal and infraorbital areas was noted from the side of the intervention. By the 5th day after the operation, the soft tissue edema was not observed, the edema of the inferior nasal concha and the oral mucosa decreased, patients noted improvement in nasal breathing compared to the first 24 hours after the operation. The serous rhinosinusitis after sinus lifting with implantation were observed in 2 patients of the control group.

By 3 weeks, the edges of the enlarged natural anastomosis were completely epithelized, there was no swelling and hyperemia.

Of the 82 implants placed in these 18 patients, 2 failed to osseointegrate. The tomographs examination showed the presence of dense bone around and above the implants. The implants appeared to be well integrated with no peri-implant bone loss. At 3 years follow up, excellent integration of grafted tissue, steady levels of bone around the implants and healthy peri-implant tissues were reported. Satisfactory facial symmetry, chewing and speech functions of the patients were restored. Implants placed in the reconstructed areas were demonstrated to integrate normally, postoperative occlusal function and esthetics have been favorable.

The development and improvement of alternative methods for restoring the integrity of the dentition with an extreme degree of atrophy of the alveolar crest of the upper jaw is very urgent.

The method of simultaneous endonasal sanitation of the maxillary sinus, endoscopic assisted sinus-lifting and dental implantation, allows to reduce the probability of perforation of the membrane, significantly shortening the rehabilitation time of patients with insufficient bone tissue in the area of the maxillary sinus. The effectiveness of a single-step plastic surgery with simultaneous implantation is high and comparable with the results of the two-stage operation.

As a result of the introduction of these innovative technologies, surgical technologies for managing patients with sinus pathology have been optimized, using minimally invasive endoscopic technique, simultaneous endonasal sanation of the maxillary sinus with endoscopic assisted sinus lifting before dental implantation.

Conclusion

The method of simultaneous endonasal sanitation of the maxillary sinus, endoscopically assisted sinus-lifting, dental implantation, allows to reduce the probability of perforation of the membrane, significantly shortening the rehabilitation period of patients with insufficient bone tissue in the maxillary sinus. Endoscope–controlled sinus augmentation yields similarly good results compared to conventional approach. These methods led to simpler, more comfortable, lower risks of morbidity, more predictable compared to more invasive maxillary sinus augmentation.

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