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‘IMPLANTOPLASTY’ – A BOON OR BANE!!!

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ABSTRACT:

The most frequent long-term issues linked to dental implants are thought to be peri-implant illnesses, which include peri-implant mucositis and peri-implantitis. The ailment may be treated with either non-surgical or surgical methods, depending on the clinical circumstances. Peri-implantitis has been demonstrated to respond poorly to nonsurgical therapy. Given that medication release can persist up to two weeks, antibiotic treatments are not highly effective over the long run. Furthermore, it is challenging to combat the bacteria once the biofilm forms because of a protective effect that is extremely challenging to remove. Regenerative or restorative operations are the most effective ways to manage peri-implantitis. Implantoplasty is one such technique, which entails polishing the contaminated implant after the windings and rough surface are removed. Furthermore, bone recontouring may be required to facilitate access for oral hygiene measures in a post-operative anatomy. The purpose of this review is to go over the benefits and drawbacks of the latest technological advancements in implantoplasty treatment.

KEY WORDS: Peri-implantitis; Peri-implant mucositis; Implantoplasty; Non-Surgical Methods.

INTRODUCTION:

Surface characteristics, such as surface topography, chemical makeup, and free energy on the implant surface, influence the development of biofilms and their makeup. Dental implants are susceptible to bacterial adhesion and colonisation due to a combination of compounding variables, including surface roughness and different physiochemical properties.[1] Peri-implant mucositis and peri-implantitis are the clinical classifications for inflammatory peri-implant disorders.[2]

Although there is no peri-implant bone loss, peri-implant mucositis is characterised by inflammation in the soft peri-implant tissues. More precisely, erythema, swelling, and bleeding upon gentle probing are its defining characteristics, along with suppuration and deeper probing pocket depths.[3] Non-surgical therapy should always come before any surgical treatment, even if it frequently fails to provide sufficient implant surface cleaning and disease resolution. [4] Better access to the implant surface, more effective cleaning, and either reconstructive or restorative techniques (such as gingivectomy or osteoplasty) are all made possible by a surgical approach. The secret to long-term success is therefore regular supportive implant care. [2] For flaws and/or aspects of defects where bone regeneration is not predicted, such as supra-osseous defects and buccal or lingual dehiscence, implantoplasty is advised.

The inflammatory tissue that surrounds the contaminated implant surface is eliminated by resection therapy.[3] Regenerative therapy aims to restore the peri-implant bone tissue by using membranes and bone grafts. Since non-surgical methods have not shown clinical efficacy in treating peri-implantitis, resection therapy is recognised as a more effective strategy. The goal of resection treatments is to smooth and polish the implant surface, which appears to have positive biological effects in stabilising bone loss. [5]

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Implantoplasty is used to create a more favourable transmucosal area by smoothing the implant's exposed threads. This mechanical alteration of the implant surface promotes the soft tissue's adaptability during the healing process and lessens bacterial adhesion. [6]

In order to improve clinical outcomes following implantoplasty, as evidenced by a decrease in purulence and bleeding as well as a reduction in periodontal pockets and an increase in implant survival, the treatment of periimplantitis necessitates the removal of contamination from the implant surface, reducing inflammation, and halting the progression of bone loss. Mechanical debridement, the use of antiseptics, local or systemic antibiotics, chemical compounds, lasers, air abrasion, access operations, reconstructive surgery, and regenerative surgery are some of the therapy methods and protocols that have been employed for this purpose.[7]

Because regenerative treatment involves handling biomaterials, membranes, and various cleaning techniques, it is costly and technically complex. Implantoplasty and restorative care could be a good option. [8]

Step by step procedure of implantoplasty: [9]

1. Preoperative Preparation

Making a diagnosis and choosing a case:

Examine the degree of bone loss, peri-implantitis, and the implant's general health. For moderate to severe peri-implantitis with exposed implant threads, implantoplasty is recommended. To arrange the surgery and assess the degree of bone loss, preoperative radiography and probing are crucial. Patient preparation involves using 0.12% chlorhexidine or another antibacterial rinse for standard oral disinfection.

To make sure the patient is comfortable, local anaesthesia is given.

2. Flap Elevation Incision and Flap Reflection:

To expose the implant, make a crestal incision and, if required, vertical releasing incisions. To reach the implant surface, reflect a mucoperiosteal flap that is full thickness. Make sure the surrounding bone and the impacted implant threads are fully exposed. Equipment: Make incisions with a scalpel (#15 or #15C blade) and lift the flap using a periosteal elevator.

3. Peri-Implant Tissue Debridement:

Use curettes or piezoelectric tools to carefully remove granulation tissue and debride the contaminated region surrounding the implant. Piezoelectric devices (e.g., Acteon, EMS Piezon®) or sharp curettes (Gracey or universal).Use saline or antimicrobial solutions (such as hydrogen peroxide or chlorhexidine) to irrigate the surgical site.

4. Mechanical Implantoplasty:

The objective is to eliminate threads and other abnormalities from the implant surface in order to smooth it out and stop additional bacterial buildup.

Methodical Procedure:

Put in an implant Thread Removal: Carefully grind down and smooth the exposed implant threads using carbide or diamond-coated burs in a high-speed handpiece.

Method: Continue to irrigate the implant with saline to keep it cold and avoid heat buildup that can harm nearby bone.

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Instruments/Burs:

Fine and superfine diamond burs are used to remove threads initially. Carbide burs to create intricate contours. Make use of contra-angle handpieces that are fast and have enough torque (about 300,000 rpm).

Surface Polishing: To create a smooth finish and lessen surface roughness that may harbour bacteria, polish the implant surface once the threads are removed. Polishing tools include highly abrasive rubber points or rubber polishing cups and discs (like the Shofu polishing kit). 30,000 rpm low-speed handpiece for delicate polishing. Advance to fine or superfine polishers after beginning with medium grit polishers.

Final Surface Finishing: To guarantee an incredibly smooth surface, apply a final polish with a titanium brush or fine polishing paste.

Tools: metal surface polishers and titanium brushes (such as ImplantProTM and Hu-Friedy). Use an explorer to continuously inspect the surface to make sure there are no rough spots and that it is smooth.

5. Decontamination of the Implant Surface (Optional):

Chemical Decontamination: Following implantoplasty, antimicrobial treatments such hydrogen peroxide, citric acid, or 0.12% chlorhexidine can be used to further disinfect the implant surface.

Tools: syringe irrigation, cotton pellets, or microbrushes.

Laser Decontamination (Optional)

After mechanical implantoplasty, the implant surface may occasionally be cleaned using lasers (such as Er or CO_2 lasers). Without endangering the surrounding tissues, lasers can improve the decrease of microorganisms on the implant surface.

Equipment: CO2 laser systems or Er lasers.

6. Closure of the Surgical Site:

Bone Grafting (If Needed):

Bone graft materials, such as xenograft or allograft, may be used to promote stability and regeneration in cases of severe bone loss. Use of Membranes: It might be recommended to cover the graft with guided bone regeneration (GBR) using a resorbable or non-resorbable membrane. Suturing: Use resorbable or non-resorbable sutures (such as PTFE or Vicryl 4-0 or 5-0 sutures) to realign and close the flap. Make sure the closure is stress-free.

Tools: scissors, micro-forceps, needle holders, and suture kit.

7. Postoperative Care:

If necessary, prescribe anti-inflammatory drugs and postoperative antibiotics. Encourage the patient to rinse with an antibacterial solution (such as 0.12% chlorhexidine) twice a day for two weeks. follow-up to check the implant and surrounding tissues again and gauge healing at one and four weeks.

ADVANTAGES OF IMPLANTOPLASTY: [5]

1. Reduction of Biofilm Accumulation
2. Prevention of Disease Progression
3. Improves Implant Longevity

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4. Cost-effective Solution

DISADVANTAGES OF IMPLANTOPLASTY: [7]

1. Mechanical Compromise of the Implant
2. Exposure of the Implant Surface
3. Heat Generation During the Procedure

DISCUSSION:

In contrast to untreated implants, implants treated with implantoplasty contain less mature and accumulated biofilm, according to research by Azzola F et al.[10] Diamond or carbide burs are used in implantoplasty to smooth out exposed implant threads, which promotes fibroblastic proliferation and the healing process by reducing bacterial adherence.[11] The surface treatment increased the surface's hydrophilia, which could be beneficial for re-osseointegration.[12] It can be concluded that implantoplasty by itself is unable to raise the likelihood of implant survival, per Ravida A et al.[13] Compared to untreated implants, implantoplasty results in decreased biofilm formation and maturation, as shown by Azzola et al., [10]. Costa-Berenguer et al. [14] showed in their study that implantoplasty results in a minor reduction in the implant's inner diameter, but that the standard diameter implant's fracture resistance remains unaffected.

Renvert et al. [15] claimed that the limited clinical improvements and propensity for disease recurrence make nonsurgical treatment of peri-implantitis ineffective.

When peri-implantitis is surgically treated, implantoplasty has been proposed as a therapy option. As an adjuvant to surgical therapy of periimplantitis, implantoplasty involves mechanically modifying the implant surface, such as by smoothing the surface and removing threads, using diamond or carbide burs. There could be two uses for this supplemental measure. A smooth implant surface may lessen bacterial adherence and growth and promote both professional and self-performed oral hygiene. The first is the efficient removal of biofilm and calcified deposits from the suprabony implant surface. The ideal outcome of this supplemental therapy would be an implant surface that promotes soft tissue adaptation and inhibits bacterial colonisation. In contrast to rough surfaces, smooth implant surfaces may promote fibroblast development, according to a number of in vitro studies. [12, 14, 15, 16]

Recent Advancement:

A novel technique introduced recently to perform implantoplasty by using an instrument called **‘impact Implant Planer’**.

Features of the iMPACT Implant Planer [Fig.1] iMPACT Implant Planer features Peri-Implantitis is a problem that the IMPACT Implant Planer solves by efficiently removing the contaminated layer from implant surfaces while creating huge, visible debris. Additionally, this novel technology optimises the stability and fitness of the implant by shaping the surrounding bone.

The IMPACT Planer has earned the "GOLD STANDARD" in implant dentistry due to its astounding success rate of over 99% in removing peri-implantitis. The IMPACT Planer provides an implant "Machined" layer that has a surface texture less than Sa 0.5 micrometres, which makes it the perfect place for re-osseointegration.

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To address a variety of implant demands, the IMPACT Planer provides a range of options, from sophisticated regenerative treatments to preventative and maintenance care. Safety and efficacy are guaranteed by the IMPACT Planer's strict adherence to FDA clearance and quality requirements.

The iMPACT Planer offers a range of solutions to meet diverse implant needs. The IMPACT Planer adheres to rigorous FDA clearance and quality standards, ensuring safety and effectiveness. With its potential to transform implant dentistry, the IMPACT Planer has gaining interest globally, contributing to better patient result. More than a device, the IMPACT Planer represents a significant leap forward in tackling implant challenges and enhancing patient well-being. But there are no long-term studies available on this instrument. [17]

FIG: 1. IMPACT'S IMPLANT PLANER

[Source: 17. Dr.Amiram Vizanski. peri-implantitis treatment by IMPACT. The rationale behind the impact as implantoplasty gold standard. Available from: https://www.peri-implantitis-solutions.com › the-rationa... Last accessed on 3rd Oct 2024.]

SUMMARY:

The use of implantoplasty is not without restrictions. The method should not be used in locations with strong functional loads, narrow diameter implants, or where substantial material removal could jeopardise the structure. When surgery is required to treat peri-implantitis, implantoplasty has become a common and dependable therapeutic option. It is an important instrument in the domains of prosthodontics and periodontics because of its capacity to lower the recurrence of disease, stabilise the health of soft and hard tissues, and preserve implant survival.

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