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Management of peri-implantitis using crestal polished bicortical conventional implants (CPBCCI^{TM}): a comprehensive review

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Abstract

Background:
Inflammation and increasing bone loss are hallmarks of peri-implantitis, a serious biological problem linked to dental implants. Because of their rough surfaces and crestal micro gaps, traditional implant designs may be more susceptible to bacterial colonization. The Crestal Polished Bicortical Conventional Implants (CPBCCI) method developed by Dr. K.A. Reddy offers a novel approach to peri-implantitis prevention and salvage therapy.

Objective:
This review aims to provide a thorough analysis of the CPBCCI protocol's justification, biomechanical benefits, clinical results, and possible application in the management and avoidance of peri-implantitis.

Methods:
The literature on polished neck designs and bicortical implantology is covered in this review, and peri-implantitis prevention strategies with a focus on Dr. Reddy's clinical approach (CPBCCI PROTOCOL^{TM})

Conclusion:
CPBCCI offers a paradigm shift in implantology, targeting both structural design and biological integration. It is a good treatment for people who are prone to peri-implantitis because of its polished crestal shape, which lowers plaque retention and soft tissue inflammation.

Keywords:

Peri-implantitis, Dental implants, Crestal polished implants, Immediate loading, CPBCCI protocol

1. Introduction

Dental implants have transformed the rehabilitation process for patients who are edentulous or partially edentulous because to their high success rates in providing both functional and aesthetic results. But peri-implant disorders, especially peri-implantitis, a pathological condition marked by inflammation in the peri-implant mucosa and gradual loss of supporting bone beyond normal remodeling, are posing a growing danger to the long-term efficacy of implant therapy [1].

According to epidemiological data, peri-implantitis may affect up to 40% of implants and 10–20% of patients over a ten-year period [2]. Microbial biofilm is a major contributor to the multifactorial etiology of peri-implantitis, which is further exacerbated by patient-related factors (such as smoking, poor oral hygiene, and history of periodontitis), prosthetic factors (such as cement residues and subgingival margins), and implant-related design elements (such as micro gaps and rough surfaces at the crestal level) [3,4].

With occurrence rates varying from 10 to 40% based on patient-related and prosthetic risk factors, peri-implantitis has become a common and difficult complication in implant dentistry. While implant surface modifications have aimed to promote osseointegration, many rough surfaces have also increased susceptibility to biofilm-induced inflammation [5]. Surgical debridement, laser therapy, and regenerative therapies are examples of traditional therapeutic approaches that frequently have poor results.

The majority of basal implants are made to engage the basal cortical bone just below the alveolar crest, especially those that are monoblock or disk-type. Nonetheless, the transmucosal or crestal zone frequently exposes their implant necks or bodies. Roughening these surfaces makes them more vulnerable to bacterial colonization, particularly once they are exposed because of soft tissue recession. Peri-implant irritation brought on by residual cement results in peri-implantitis [6].

The long-term peri-implant tissue health is improved by the CPBCCI approach, which places an emphasis on minimizing crestal bone stress, removing rough areas close to the gingival margin, and strategically engaging stable basal cortical bone. Additionally, prosthetic flexibility and compatibility with common restorative components are made possible by the use of normal threaded bodies rather than Monoblock basal designs.

The CPBCCI protocol provides a preventive and therapeutic paradigm change in light of the rising prevalence of peri-implantitis and the shortcomings of existing treatment techniques. Using recent data and clinical insights, this study attempts to investigate the biomechanical concepts, therapeutic results, and clinical justification of CPBCCI in the context of managing peri-implantitis.

2. The CPBCCI Implant Design: Key Features

a. Crestal Polished Surface

Because of its high level of polishing, the implant's coronal 2-3 mm has less bacterial adherence and soft tissue inflammation. On smooth surfaces, studies have shown noticeably less plaque accumulation [3].

b. Bicortical Anchorage

By engaging two cortical plates (such as the nasal floor, pterygoid, and zygomatic buttress), implants stabilize without compromising the crestal bone. This lessens reliance on peri-crestal osseointegration and improves primary stability [4].

c. Conventional Threaded Design

The threaded body of CPBCCI, in contrast to basal implants, ensures optimal stress distribution and compatibility with conventional prosthetics.

3. Biological Basis for Peri-Implantitis Resistance

Feature	CPBCCI Advantage	Biological Impact
Polished crestal collar	Reduces plaque and inflammation	Limits initiation of peri-implantitis
Sub crestal rough surfaces	Avoided in CPBCCI	Reduces bone loss and microbial colonization
Bicortical fixation	Minimal crestal stress	Enhances long-term bone stability
Screw-retained prosthesis	Preferred approach	Eliminates cement-induced peri-implantitis risk

4. Clinical Applications of CPBCCI in Peri-Implantitis Management

1. **Implant Replacement in Failed Sites**
2. When peri-implantitis causes an implant to fail, the contaminated fixture is removed, and a CPBCCI implant is inserted right away to provide bicortical fixation distant from the inflammatory area.
3. **Rehabilitation in Atrophic Ridges**
4. By allowing insertion in native cortical bone without the requirement for grafting, CPBCCI lowers the danger of infection and inflammatory breakdown, even in cases of extensive bone loss.

5. Recommendations

Longitudinal studies that follow patients for five to ten years are needed in order to evaluate the CPBCCI protocol's long-term mortality rates, marginal bone stability, and patient satisfaction. Clinicians should get systematic training in CPBCCI procedures since bicortical implant placement necessitates surgical competence and an understanding of anatomical landmarks, particularly for engagement in distant cortices such as the symphysis, pterygoid plate, or nasal floor.

6. Conclusion

In modern implant dentistry, peri-implantitis is still one of the most common biological side effects that might jeopardize both functional and aesthetic results. Both preventive measures and trustworthy interventions that go beyond conventional treatment paradigms are desperately needed as the prevalence of peri-implant illnesses keeps rising.

Dr. K.A. Reddy's Crystal Polished Bicortical Conventional Implants (CPBCCI) procedure is a biomechanically and physiologically based breakthrough that fundamentally addresses the multiple etiology of peri-implantitis. There is more to this protocol than just a novel design. Bicortical anchoring provides a strong defense against peri-implantitis by reducing bacterial colonization and increasing mechanical stability. With increasing clinical data and patient-focused results, CPBCCI could lead to the next phase of implantology.

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