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# MULTI-UNIT ABUTMENTS IN PROSTHODONTICS: A NARRATIVE REVIEW

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## ABSTRACT

**Background:** Multi-unit abutments (MUAs) have become a cornerstone in contemporary implant prosthodontics, particularly in full-arch and immediate loading protocols. Their ability to correct implant angulation, provide a standardized restorative platform, and enhance prosthetic retrievability has contributed significantly to improved clinical outcomes. **Objective:** This narrative review aims to critically evaluate the indications, design principles, biomechanical considerations, clinical applications, advantages, limitations, and long-term outcomes associated with multi-unit abutments in prosthodontics. **Results:** Multi-unit abutments allow correction of non-ideal implant angulation, facilitate immediate loading, improve passive fit of prostheses, and reduce peri-implant soft tissue trauma. Clinical studies report high implant survival rates and favorable long-term outcomes when MUAs are used following proper prosthetic planning. **Conclusion:** Multi-unit abutments represent a reliable and versatile prosthetic solution in modern implant dentistry. When incorporated into a prosthetically driven treatment plan, they enhance biomechanical stability, prosthetic accuracy, and maintenance efficiency, making them indispensable in advanced implant prosthodontics.

**KEYWORDS:** Multi-unit abutments, implant prosthodontics, full-arch rehabilitation, angulated implants, immediate loading

## INTRODUCTION

The success of dental implants is dependent not only on osseointegration but also on precise prosthetic execution. Ideal implant placement is frequently compromised by anatomical limitations such as insufficient bone volume, maxillary sinus proximity, and the location of the inferior alveolar nerve. These challenges often necessitate implant placement at non-axial angulations, creating restorative difficulties.

Multi-unit abutments were developed to overcome such limitations by providing a prosthetic intermediary between the implant and the definitive restoration. Initially introduced for full-arch restorations, MUAs have since expanded in application to partial and single-tooth implant restorations. Their role in immediate loading and full-arch implant concepts has further reinforced their clinical relevance.

### Historical Evolution

Early implant prosthodontics relied on restorations fabricated directly at the implant platform. This approach often resulted in prosthetic misfit, unfavorable screw access positions, and repeated disruption of peri-implant tissues. The introduction of intermediary abutments marked a significant milestone in addressing these issues.

The emergence of tilted implant protocols, particularly the All-on-4 concept, highlighted the need for prosthetic components capable of compensating for implant angulation. Multi-unit abutments provided a predictable solution by establishing a common prosthetic platform irrespective of implant orientation.

### Definition and Concept

A multi-unit abutment is a prefabricated or customized prosthetic component that is connected to an implant fixture and serves as a definitive restorative interface for implant-supported prostheses. It is designed to remain permanently connected to the implant, allowing prosthetic procedures to be performed at the abutment level rather than the implant level.

### Classification of Multi-Unit Abutments

Based on Angulation

- Straight (0°)
- Angulated (typically 17° and 30°)
- Custom-angled abutments

Based on Height

- Low profile
- Medium height
- High profile

  Based on Fabrication
- Stock multi-unit abutments
- CAD/CAM customized multi-unit abutments

  Based on Implant–Abutment Connection
- External hex
- Internal hex
- Morse taper connection

**Design Characteristics**

Multi-unit abutments are characterized by a prosthetic platform positioned above the implant level, which minimizes repeated manipulation of peri-implant soft tissues. Anti-rotational features and precision-machined interfaces contribute to improved prosthetic stability. The standardized platform simplifies impression procedures and prosthesis fabrication.

**Biomechanical Considerations**

Biomechanical stability is a critical factor in implant longevity. Multi-unit abutments improve force distribution by redirecting occlusal loads closer to the long axis of the implant. Angulated MUAs have been shown to compensate for tilted implants without significantly increasing stress concentrations when splinted appropriately.

The use of MUAs also enhances passive fit by reducing cumulative errors during impression making and framework fabrication. Improved passivity minimizes mechanical complications such as screw loosening and component fracture.

**Clinical Indications**

- Full-arch implant-supported fixed prostheses
- Immediate loading protocols
- Non-parallel implant placement
- Anatomically constrained implant positioning
- Need for retrievable prosthetic designs
- Esthetic correction of screw access channels

**Contraindications**

- Inadequate interarch space
- Poor primary implant stability
- Situations favoring cement-retained restorations
- Excessive crown height space without biomechanical planning

**Clinical Protocol**

Surgical Phase

Implants are placed following prosthetically driven planning, often utilizing tilted implants in posterior regions to avoid anatomical structures.

Abutment Placement

Multi-unit abutments are connected immediately or during second-stage surgery and torqued according to manufacturer specifications.

Prosthetic Phase

Impressions are made at the abutment level, simplifying procedures and enhancing accuracy. Definitive prostheses are commonly screw-retained, allowing retrievability.

**Advantages of Multi-Unit Abutments**

- Correction of implant angulation
- Standardized restorative platform
- Improved prosthetic passivity
- Reduced soft tissue trauma
- Compatibility with immediate loading
- Enhanced maintenance and retrievability

**Limitations and Complications**

Potential limitations include increased treatment cost, additional vertical height, and technique sensitivity. Mechanical complications such as screw loosening may occur if improper torque protocols are followed. However, reported complication rates remain low when evidence-based protocols are adhered to.

**Role in Immediate Loading Protocols**

Multi-unit abutments are integral to immediate loading strategies. By splinting implants at the abutment level, micromovements are reduced, promoting favorable osseointegration. The standardized platform also facilitates rapid fabrication of provisional restorations.

### Long-Term Outcomes and Maintenance

Long-term clinical studies report high survival rates for implants restored using MUAs. The retrievability of screw-retained prostheses simplifies maintenance, repair, and hygiene management, contributing to long-term peri-implant health.

### Future Perspectives

Advancements in digital dentistry and CAD/CAM technology have enabled the fabrication of customized multi-unit abutments with enhanced precision. Integration with guided surgery and digital workflows is expected to further improve accuracy, efficiency, and clinical outcomes.

## CONCLUSION

Multi-unit abutments have revolutionized implant prosthodontics by enabling predictable rehabilitation of complex clinical scenarios. Their ability to correct implant angulation, support immediate loading, and improve prosthetic accuracy makes them an essential component of contemporary implant therapy. Proper case selection and meticulous prosthetic planning are critical to achieving optimal outcomes.

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