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Screwmentable Implant-Supported Prostheses: A Narrative Review

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Abstract

Abstract

The evolution of implant-supported prostheses has revolutionized prosthodontic rehabilitation, enhancing both functional and esthetic outcomes. Among the different modes of prosthesis retention, the hybrid screwmentable implant-supported prosthesis, which integrates the benefits of both screw-retained and cement-retained designs, has gained prominence. This narrative review explores the rationale behind screwmentable designs, discusses their biomechanical and clinical advantages, and reviews relevant literature concerning their performance, complications, and future potential. Current evidence suggests that screwmentable prostheses offer superior retrievability, passive fit, and optimal esthetics, while minimizing cement-induced peri-implant disease. However, clinical success is dependent on case selection, precise fabrication techniques, and meticulous follow-up care.

Keywords: Screwmentable prosthesis; Implant-supported prosthesis; Hybrid retention; Cement-retained implant crowns; Screw-retained prosthesis; Peri-implantitis.

Introduction

Implant dentistry has undergone substantial advancements, especially in the design and retention of implant-supported prostheses. Two primary retention methods—screw-retained and cement-retained prostheses—have long dominated prosthodontic rehabilitation. Each has inherent advantages and limitations. Screw-retained prostheses facilitate easy retrievability, but may present with esthetic concerns and screw loosening [1]. On the other hand, cement-retained prostheses offer superior esthetics and passive fit but are often criticized for difficulties in retrieval and risks of residual cement leading to peri-implantitis [2].

To overcome the limitations of both types, the screwmentable prosthesis was introduced. This hybrid approach involves cementing the restoration onto a custom or stock abutment extraorally, followed by screwing the assembly onto the implant, thus combining the retrievability of screw-retained prostheses with the esthetics and passive fit of cement-retained ones [3]. This narrative review critically appraises the design rationale, advantages, clinical protocols, and current literature pertaining to screwmentable prostheses.

Discussion

1. Rationale and Concept

Screwmentable prostheses are fabricated by luting a crown or bridge to an abutment outside the oral cavity and then securing the entire assembly into the implant using a screw. This method eliminates the need to use cement intraorally, thus reducing cement-induced peri-implant diseases while still achieving an esthetic emergence profile and optimal occlusal access [4].

2. Advantages of Screwmentable Prostheses

• Retrievability: Since the prosthesis is secured by a screw, it can be retrieved easily for hygiene maintenance or repairs [5].

• Esthetics: By removing the screw access hole from the crown surface, better esthetic outcomes can be achieved, especially in anterior restorations [6].

• Cement Control: Cementation is performed extraorally, preventing subgingival cement excess, a known contributor to peri-implantitis [7].

• Passivity of Fit: The use of customized abutments ensures a passive fit, minimizing the mechanical stress at the implant-abutment interface [8].

3. Limitations

Despite their advantages, screwmentable prostheses are not without limitations:

• Complexity in Fabrication: The need for precise laboratory protocols increases complexity and cost [9].

• Vertical Space Requirements: Adequate interocclusal space is needed to accommodate the screw access channel and the cemented restoration [10].

• Technical Complications: Potential for decementation of the crown from the abutment if not properly bonded [11].

4. Indications

Screwmentable prostheses are ideal in the following scenarios:

• Cases with compromised angulation where screw access emerges buccally.

• Esthetically critical zones.

• Cases where retrievability is necessary for future maintenance.

5. Review of Literature

• Buser et al. (1997) were among the first to discuss the biological complications associated with excess cement, prompting a reevaluation of cement-retained prostheses in implant dentistry [2].

• Shadid and Sadaqa (2012) highlighted that retrievability and peri-implant health were better managed with screw-retained designs [1].

• Linkevicius et al. (2013) provided clinical evidence linking residual cement to increased peri-implantitis, reinforcing the value of extraoral cementation as seen in screwmentable prostheses [7].

• Mangano et al. (2014) compared survival and complication rates in screw-retained, cement-retained, and screwmentable prostheses and found the screwmentable type to exhibit a favorable balance of retrievability and tissue response [12].

• Papaspyridakos et al. (2014) reported lower mechanical complications and higher patient satisfaction in screwmentable fixed prostheses in long-term follow-up studies [13].

6. Clinical Protocol

1. Fabricate custom or stock abutments.
2. Extraorally cement the crown or bridge using resin cement, ensuring complete removal of excess cement.
3. Screw the abutment-prosthesis assembly intraorally using a torque wrench, usually at 30–35 Ncm.
4. Seal the screw access with PTFE tape and composite resin.

7. Recent Developments

• Digital workflows now allow for CAD/CAM design and milling of screwmentable restorations, improving fit and reducing chairside time [14].

• The use of zirconia abutments and monolithic restorations is enhancing the biomechanical and esthetic performance of screwmentable prostheses [15].

Conclusion

Screwmentable implant-supported prostheses represent a significant innovation in implant prosthodontics by effectively combining the desirable features of screw-retained and cement-retained restorations. They offer improved esthetics, reduced biological complications, and maintain retrievability, making them a preferred option in many clinical scenarios. Future studies should continue to evaluate long-term outcomes, especially with emerging materials and digital techniques, to further solidify their role in contemporary implantology.

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