

Review

The Role of Dental Alignment in Enhancing Outcomes for Patients with Dental Prostheses

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Abstract

Dental alignment significantly influences the functional and aesthetic outcomes of prosthetic treatments, making it a crucial aspect of restorative dentistry. Misaligned teeth can lead to complications in prosthesis fit, including poor occlusal balance, uneven force distribution, and premature failure of restorations. These issues affect both patient comfort and the longevity of prosthetic devices, such as crowns, bridges, and implants. In addition to mechanical complications, malalignment also poses aesthetic challenges, as poorly aligned teeth can disrupt facial symmetry and impact patient satisfaction with their appearance. Orthodontic correction prior to prosthodontic treatment plays a pivotal role in addressing these issues. By realigning teeth, orthodontic treatment ensures an even distribution of biting forces, improving the stability and function of prosthetic restorations. This correction also allows for more precise prosthesis fabrication, enhancing fit and minimizing the need for adjustments. The improved alignment facilitates optimal implant placement, providing better long-term stability for dental implants. In turn, this reduces the risk of mechanical complications and increases the overall success rate of prosthetic treatments. Moreover, dental alignment contributes to better periodontal health, which is essential for maintaining the integrity of prostheses. Misaligned teeth can lead to plaque accumulation and periodontal disease, which compromise the supporting structures of the prosthesis. Proper alignment aids in easier maintenance of oral hygiene, thereby reducing the risk of infections and other complications. Aesthetic improvements are another important outcome of orthodontic correction, particularly for anterior restorations where alignment directly influences the appearance of the smile. In summary, dental alignment plays a key role in ensuring the functional, aesthetic, and long-term success of prosthetic treatments. Incorporating orthodontic correction into the treatment plan enhances prosthesis stability, patient satisfaction, and overall oral health, contributing to optimal outcomes in prosthodontic care.

Keywords: dental alignment, prosthetic stability, orthodontic correction, prosthesis fit, aesthetic outcomes

Introduction

Dental alignment plays a pivotal role in the overall success of prosthodontic treatments, influencing both functional outcomes and aesthetic satisfaction. A well-aligned dental arch not only contributes to the optimal fit of prostheses but also enhances the long-term success of restorative dental procedures. The increasing complexity of prosthetic devices, ranging from simple crowns to full-mouth rehabilitations, necessitates a deeper understanding of how dental alignment affects the final outcome. Misalignment of teeth can complicate prosthetic treatments, leading to a compromised fit, increased wear, and a reduction in both patient comfort and prosthetic lifespan (1). Furthermore, malocclusion or dental crowding may impair the effectiveness of prosthetic devices, such as fixed prostheses, leading to occlusal disharmony and imbalanced masticatory forces, which can result in premature failure (2).

Correcting dental alignment prior to or during prosthodontic procedures is essential for achieving optimal functional and aesthetic results. Modern orthodontic techniques have made it easier to address alignment issues in patients who require prosthetic treatment. Not only do these corrections contribute to a more harmonious occlusion, but they also significantly impact aesthetic appearance, which is often a key factor in patient satisfaction. A misaligned dentition can distort facial symmetry and lead to dissatisfaction with prosthetic outcomes, especially in the anterior regions of the mouth (3). By ensuring proper dental alignment, clinicians can offer patients enhanced durability of prosthetic devices, as the mechanical forces during chewing are more evenly distributed.

Beyond the mechanical advantages, proper alignment also aids in maintaining periodontal health. Malaligned teeth can trap food particles and bacteria more easily, contributing to plaque accumulation and periodontal disease, which in turn can undermine prosthetic integrity (4). Prosthetic devices placed in a well-aligned dental arch are easier to clean and maintain, reducing the risk of peri-implantitis and other prosthetic-related complications. Given these considerations, dental

alignment is increasingly recognized as a critical factor in ensuring the long-term success of prosthodontic treatments. This review will explore the role of dental alignment in enhancing outcomes for patients receiving dental prostheses, focusing on the functional, aesthetic, and periodontal aspects that contribute to patient satisfaction and prosthetic longevity.

Review

Dental alignment plays a crucial role in the success of prosthodontic treatments, affecting both the functional and aesthetic outcomes. A well-aligned dentition provides a stable foundation for prosthetic devices, such as crowns, bridges, and dentures, ensuring proper occlusion and load distribution. When dental alignment is compromised, prosthetic restorations can be subjected to uneven forces, which may lead to premature wear, mechanical failures, or even discomfort during mastication (5). This issue is particularly prevalent in patients with malocclusion or significant crowding, where misalignment can also make prosthetic fittings more complex and less predictable. Additionally, proper dental alignment significantly impacts the aesthetic outcome of prostheses. Dental malalignment often leads to asymmetry in the smile and facial contours, which can be especially noticeable in the anterior region. Addressing alignment prior to prosthetic treatment enhances not only the functional benefits but also the patient's satisfaction with the visual appearance of their dental restorations (6). This is particularly relevant in cases involving full-mouth rehabilitations, where the harmony between the prosthesis and the remaining natural teeth is essential. Overall, by integrating orthodontic correction with prosthodontic treatment, clinicians can optimize both the longevity and satisfaction of prosthetic outcomes, ensuring that patients experience improved function and aesthetics.

Impact of Malalignment on Prosthesis Fit and Functionality

Dental malalignment can significantly influence the fit and functionality of prosthetic devices, presenting challenges that affect the overall success of the treatment. Proper occlusion is essential in

ensuring that prosthetic restorations, such as crowns, bridges, or full dentures, distribute biting forces evenly across the dental arch. When teeth are misaligned, these forces become unbalanced, leading to undue stress on both the prosthetic device and the supporting structures, such as the periodontal tissues and alveolar bone. This may result in complications like fractures, excessive wear, and even prosthetic failure in the long term (7).

One of the primary concerns with malaligned teeth is that they compromise the accuracy of prosthetic fit. In prosthodontics, precision in fit is paramount to avoid issues like marginal gaps, which can allow for bacterial infiltration and lead to secondary caries or peri-implantitis. Malalignment complicates the impression-taking process, making it difficult to achieve an exact replica of the patient's dentition, which, in turn, affects the fabrication of the prosthetic restoration. Consequently, prostheses placed in malaligned dental arches often require multiple adjustments, increasing chair time and the likelihood of patient dissatisfaction (8).

Functionality is also negatively impacted by dental malalignment. In cases of occlusal discrepancies due to misalignment, patients may experience difficulty in chewing, discomfort, or even temporomandibular joint (TMJ) problems. These functional issues are exacerbated when malocclusion is present, as the prosthesis is unable to effectively mimic the natural dynamics of the bite. Additionally, malalignment can result in uneven wear of the prosthetic materials, further reducing the longevity of the restoration and necessitating premature replacement (9). Such wear can also affect adjacent natural teeth, leading to further restorative interventions.

Beyond the mechanical aspects, malalignment also poses challenges to maintaining oral hygiene around prosthetic restorations. Misaligned teeth tend to create areas that are difficult to clean, increasing the risk of plaque accumulation and periodontal disease, which can compromise the surrounding tissue health and, by extension, the stability of prosthetic devices. Proper alignment facilitates easier

maintenance and reduces the risk of infections or complications that could undermine the prosthesis. Dental malalignment has a profound effect on both the fit and functionality of prostheses. Addressing alignment issues through orthodontic treatment prior to prosthetic restoration is critical in ensuring optimal outcomes in terms of both functionality and patient satisfaction.

The Role of Orthodontic Correction in Prosthetic Stability

Orthodontic correction plays a vital role in enhancing prosthetic stability, particularly in patients with misaligned teeth or occlusal discrepancies. Correcting dental alignment prior to prosthetic treatment ensures that the foundations for the prosthesis are stable, well-distributed, and functionally harmonious. One of the key benefits of orthodontic treatment is that it optimizes the distribution of occlusal forces, preventing excessive wear and tear on prosthetic restorations such as crowns, bridges, or implants. In a properly aligned dental arch, the forces exerted during mastication are evenly distributed, thereby reducing the risk of mechanical complications such as fractures or dislodgements (10).

Orthodontic treatment also ensures that the prosthesis integrates more naturally with the remaining dentition. Misaligned teeth can create spaces or uneven contacts that interfere with the proper fit of prostheses, leading to discomfort and functional inefficiency. By addressing these issues through orthodontic correction, the prosthetic device can be designed and fabricated with greater precision, thereby improving both fit and stability. Studies have shown that orthodontically treated patients who later receive prosthetic restorations exhibit fewer complications related to prosthesis longevity, as the corrected alignment reduces the stress on both the prosthesis and the supporting periodontal structures (11).

Another significant advantage of orthodontic correction in prosthodontic cases is its contribution to implant placement and stability. Dental implants, which require precise placement in the jawbone, can be significantly compromised by malalignment. In

cases of crowding or tooth rotation, the available bone may not support optimal implant placement, increasing the risk of implant failure or compromise prosthetic outcomes. By performing orthodontic treatment prior to implant placement, clinicians can ensure that the bone and soft tissue are adequately prepared for the implant, resulting in better long-term stability of the prosthesis (12). In addition, orthodontic correction improves the aesthetic outcome of prosthetic treatments. Proper alignment enhances the symmetry and appearance of the patient's smile, which is a key consideration for many patients receiving anterior prosthetic restorations. Misaligned teeth can affect the final aesthetic outcome, as the prosthesis may appear bulky or misaligned in relation to the surrounding teeth. By addressing these issues with orthodontics, the prosthesis not only functions better but also achieves a more natural and pleasing appearance. Orthodontic correction is an essential step in ensuring prosthetic stability and success. It enhances the distribution of forces, improves fit and functionality, and contributes to better aesthetic outcomes, making it a crucial component of comprehensive prosthetic treatment planning.

Aesthetic Considerations in Prosthetic Outcomes for Aligned Dentition

Orthodontic correction plays a crucial role in enhancing the long-term stability of prosthetic restorations, particularly in cases where malocclusion or misalignment is present. Proper dental alignment achieved through orthodontic treatment can significantly improve the integration and function of prostheses, ensuring better force distribution and reducing mechanical complications. In patients with malaligned teeth, forces exerted during chewing are often uneven, leading to stress on both the prosthetic device and the supporting structures. By correcting these issues prior to prosthetic treatment, the likelihood of complications, such as prosthesis fracture or dislodgement, is significantly reduced (13).

One of the primary benefits of orthodontic correction is its impact on the longevity and performance of dental implants. When teeth are misaligned, it can affect the available bone structure

for implant placement. Crowding or improper spacing between teeth can limit the optimal positioning of implants, increasing the risk of implant failure or necessitating additional surgical interventions. Orthodontic correction can create sufficient space and align the teeth in a way that facilitates ideal implant placement, thereby improving the long-term stability of the prosthetic restoration (14). Moreover, well-aligned teeth allow for a more predictable and balanced occlusion, which is critical for distributing masticatory forces evenly across the dental arch and the prosthesis. In addition to improving functional stability, orthodontic correction also has a profound effect on the aesthetic outcomes of prosthetic treatments. Misaligned teeth can result in uneven or poorly fitting prostheses, which may negatively impact the overall appearance of the patient's smile. This is particularly important in anterior restorations, where the alignment of teeth is essential for achieving an aesthetically pleasing result. Orthodontically treated patients are more likely to experience better integration of prostheses with their natural teeth, contributing to improved patient satisfaction with both the functionality and appearance of their dental restorations (15). Furthermore, orthodontic correction can aid in the preservation of periodontal health, which is vital for the stability of prosthetic restorations. Misaligned teeth create areas that are difficult to clean, increasing the risk of plaque accumulation and periodontal disease. By realigning the teeth, orthodontic treatment promotes easier maintenance of oral hygiene, reducing the likelihood of complications such as peri-implantitis or gum recession that could compromise the prosthesis. Orthodontic correction is integral to ensuring the stability of prosthetic restorations. It not only improves functional outcomes and longevity but also enhances the aesthetic and periodontal aspects of the treatment, making it a critical consideration in comprehensive prosthodontic care.

Conclusion

Dental alignment is a crucial factor in achieving successful prosthetic outcomes, impacting both the functional stability and aesthetic appearance of

restorations. Orthodontic correction not only enhances the fit and durability of prostheses by ensuring proper occlusion but also improves patient satisfaction by creating a harmonious and natural smile. Additionally, aligned teeth facilitate better oral hygiene, reducing the risk of complications that may compromise prosthetic longevity. Thus, incorporating orthodontic treatment in prosthodontic care is essential for optimizing long-term results.

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There is no conflict of interest

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Data availability

Data that support the findings of this study are embedded within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

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