Critically Appraised Topic (CAT)

Project Team:
4B-1
Project Team Participants:
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Clinical Question:
What treatment plan options should be considered when replacing maxillary anterior teeth/tooth in patients with a high smile line and (excessive resorption) bony defect of the maxillary ridge?
PICO Format:
P:
Patients with missing teeth a high smile line and bone resorption
I:
Fixed partial denture
C:
Implants
O:
Papilla thickness and tissue regarding esthetics
PICO Formatted Question:
In patients with missing teeth/tooth that have a high smile line and resorption will a FPD or implant yield a more esthetic result?
Clinical Bottom Line:
■ **More research needs to be done to most effectively compare the two modalities of treatment** ■ **Both yield similar results when comparing papilla thickness and tissue regarding esthetics**
Date(s) of Search:
10/20/20 & 10/22/20
Database(s) Used:
Pubmed
Search Strategy/Keywords:
Maxillary anterior esthestics, Fixed partial denture, Missing teeth, Implants, tissue esthetics
MESH terms used:
dental implants, single tooth; dental prosthesis, implant-supported; tooth loss/rehabilitation, maxilla, esthetics dental
Article(s) Cited:

Meyenberg, K., Imoberdorf, M.(1997). The aesthetic challenges of single tooth replacement: A comparison of treatment alternatives. Retrieved October 27, 2020, from https://pubmed.ncbi.nlm.nih.gov/9743679/

Hebel, K., Gajjar, R., & Hofstede, T. (2000). Single-Tooth Replacement: Bridge vs. Implant-Supported Restoration. Retrieved October 27, 2020, from http://www.cda-adc.ca/jcda/vol-66/issue-8/435.html

Studer, S., Pietrobon, N., & Wohlwend, A.(1994, January). Maxillary anterior single-tooth replacement: Comparison of three treatment modalities. Retrieved October 27, 2020, from https://pubmed.ncbi.nlm.nih.gov/8180370/

Study Design(s):

Clinical practice guidelines, Case series

Reason for Article Selection:

Pertained to PICO

Article(s) Synopsis:

1. In comparing different treatment modalities for replacing a single maxillary anterior tooth, three clinical case studies were analyzed to determine aesthetic success. The first case the patient presented with a non-restorable maxillary right central incisor. Contributing factors that were considered included thick tissue morphotype, small to medium size defects on the alveolar ridge, and excellent motivation and compliance. It was elected that the number eight be extracted and there after guided bone and tissue regeneration be done before placing the implant. Adjacent teeth were restored with laminated veneers.

The final case discusses how a conventional Porcelain fused to metal(PFM) bridge was used for a patient that presented with periodontal involvement and protrusion of maxillary anterior teeth. It was elected to go ahead with a 6-unit bridge with ovate pontic designs to support buccal soft tissue and papillae using slight pressure.

For fixed partial dentures it was determined that a convex ovate pontic design was required to facilitate proper hygiene. If the edentulous area has insufficient keratinized tissue, tissue augmentation with a provisional was indicated to contour the area. In implants, the emergence profile played a critical role in maintaining tissue esthetics. It was also found that it was more adaptable to horizontally flat bone. Soft tissue contouring is done by placing a healing abutment followed by a provisional restoration to preserve and shape the emergence profile allowing for the final prosthesis to be esthetically successful.

Neither was found to be superior over the other in relation to papilla thickness and tissue esthetics. They each yielded successful esthetic outcomes in replacing maxillary

anterior teeth when either tissue contouring, and or bone grafting were performed. There are challenges and indications alongside each treatment modality depending on the unique complications each patient presents with. Both can yield similar excellent esthetic outcomes although implants tends to be more technically demanding.

The article uses only three clinical case studies to reinforce their ideas of what makes a conventional bridge or implant esthetically successful. Data is also a bit dated being from 1997. More recently, techniques may be more predictable or improved since then.

2. Several factors were examined when comparing treatment modalities for maxillary anterior single-tooth replacement. Those variables that most pertain to aesthetics are predictability of aesthetic outcome, preservation of tooth structure, preservation of periodontal tissue and alveolar bone, and prospective treatment issues.

Fixed partial dentures have been known to have high predictability of aesthetic success but preparation of adjacent abutment teeth leads to irreversible loss of dentin and enamel. Subgingival crown margins greater than 2mm have issues such as improper emergence profiles, difficulty to finish and close subgingival margins(recurrent decay-suboptimal aesthetics), areas with decreased or no attached gingiva, and violation of biological width. It is also difficult to preserve periodontal health during and after treatment.

In implants, osseointegration has become more predictable leading to greater aesthetic success but often may be unsatisfactory if soft tissue isn't managed appropriately. Although an advantage is adjacent teeth structure untouched. On the other hand, perrimplant tissue susceptibility to gingivitis is a risk and periodontal breakdown tend to be have more of an apical extension compared to natural teeth. Surgical intervention and extended recovery time is often needed to address bone and tissue deficiencies and allow for osseointegration.

Indication for using a conventional PFM bridge is when adjacent teeth are affected by carious lesions or have existing restorations that are extensive. If preservation of hard tissue is of great concern, then an implant may be an appropriate treatment modality.

Single-tooth implants in aesthetically driven regions should be considered with caution due to additional surgical interventions and requirements such as sufficient bone and soft tissue manipulation. Patients need to also consider the additional time needed for recovery and osseointegration. A conventional partial bridge is more aesthetically predictable in most cases.

This review is dated being from 1994 and relies on expert opinion of a few rather than analyzing a larger population to make a stronger case for these evolving treatment modalities.

3. The last article was in favor of using implants over a bridge to replace a single tooth.

Again, we see disadvantages of fixed partial dentures being reduction of adjacent teeth is required and for esthetic cases subgingival margins may be more difficult. Where a bridge is indicated is when the edentulous site already has lack of bone support, adjacent teeth are demineralized, and the time required is less demanding.

As for implants, the article states the esthetic success has become more predictable and there isn't a need to prepare adjacent teeth. However, it is more technique sensitive to achieve esthetic success if there is inadequate bone or soft tissue. Surgical intervention to correct those deficiencies takes time to heal and may complicate outcome for esthetic success.

Takeaways from this articles are that esthetic predictability of a 3 unit-bridge is excellent and doesn't require as much time compared to implants. If one part of a PFM bridge fails, the entire restoration is more at risk. Better prognosis of adjacent teeth in implants because they are untouched. Implants are more technically demanding but advances in technology have allowed implants to have the edge when it comes to restoring a single tooth in terms of developing great esthetics and overall longevity. The article is no longer current being from the year 2000 and doesn't specify what advances in technology give implants greater esthetics and longevity.

Levels of Evidence: (For Therapy/Prevention, Etiology/Harm)
See http://www.cebm.net/index.aspx?o=1025

☒ **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)
☐ **1b** – Individual RCT
☐ **2a** – Systematic Review of Cohort Studies
☐ **2b** – Individual Cohort Study
☐ **3** – Cross-sectional Studies, Ecologic Studies, "Outcomes" Research
☐ **4a** – Systematic Review of Case Control Studies
☐ **4b** – Individual Case Control Study
☒ **5** – Case Series, Case Reports
☐ **6** – Expert Opinion without explicit critical appraisal, Narrative Review
☐ **7** – Animal Research
☐ **8** – In Vitro Research

Strength of Recommendation Taxonomy (SORT) For Guidelines and Systematic Reviews
See article **J Evid Base Dent Pract 2007;147-150**

☐ **A** – Consistent, good quality patient oriented evidence
☒ **B** – Inconsistent or limited quality patient oriented evidence

☐ **C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening
Conclusion(s):
■ **Conventional bridges and implants were determined to have similar esthetic results** ■ **Implants tend to be more technically demanding but preserves adjacent tooth structure** ■ **The articles presented conflicting results comparing esthetics between the two treatment modalities** ■ **Not many studies directly compare papilla thickness and tissue esthetics for the different treatment modalities when replacing missing teeth** ■ **More long term follow up is needed to determine if one yields a more esthetic result over the other**