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The fabrication of two Maxillary Anterior Implant-Retained Crowns

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Introduction

This case involves a patient who arrived at Tygerberg Hospital with an abscess in the 14 tooth. The patient had a bridge from the 12 to the 14. Previously a root canal was done on the 14 tooth. The patient complained of pain and irritation in the 14 region, which resulted in mastication becoming a painful process. The purpose of this study is to determine the best manner to go about fully restoring the masticatory function of the patient and retaining the aesthetics.

The different options available will be listed and from this list, the best option would be chosen, reasons for the choice will also be given.
The condition

The patient arrived at Tygerberg Hospital and complained of pain while masticating. The patient had a bridge from the 12 to the 14 (figure 1).

Figure 1

When examined, a lateral periodontal abscess was found. Because the 14 pontic of the bridge was poorly constructed, the fit was not very good. This resulted in friction between the restoration and the post. Due to the friction a hole formed at the base of the pontic. Foreign material leaked into the cavity left by the root canal. This resulted in the abscess forming.

The bridge covered the 12 to the 14. The 12 pontic looked in very good condition so there was no reason to remove it. The bridge was therefore separated between the 12 and 13.
The 1\textsuperscript{st} clinical procedures

The bridge was cut between the 12 and 13. The 14 was removed and after the removal, the tissue was surgically sutured to prevent infection, exposure and ulceration of the tissue. After the removal of the 14 and 13, it was necessary to replace the missing teeth. For this reason a transitional denture (figure 2) was constructed and inserted after the tissue was sutured.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{transitional_denture.jpg}
\caption{Transitional denture}
\end{figure}

The reasons for the transitional denture are:

- To prevent the drifting of the adjacent teeth
- To fully restore mastication
- To prevent food from irritating the tissue
- For aesthetic reasons
Dental Technology Treatment Options

After the tissue has healed a more permanent restoration can be inserted. There are 3 options open to the patient. The patient could choose an acrylic denture, cobalt-chrome denture or implant-supported crowns.

Acrylic denture

Advantages

- Inexpensive +/- R600
- Comfortable

Disadvantages

- Must be cleaned regularly
- Increased risk of fracturing

This denture is very simple to fabricate. It is inexpensive and the aesthetics are not too bad. It is a comfortable for the patient to wear, because it is made from acrylic, it is thin and gives full palatal coverage. This denture can be removed by the patient and should be removed regularly for cleaning. If handled correctly, this denture could last for more than 2 years, but it can fracture easily if handled incorrectly.
Cobalt-chrome denture

Advantages

- Excellent support
- Durability

Disadvantages

- Expensive +/- R1100
- Discomfort
- Not suitable as healing appliance
- Must be well designed

The cobalt-chrome denture is a very sturdy appliance and supports the surrounding tissue and standing teeth very well. Being made of cobalt-chrome it will not break easily. It is a bit more expensive than the acrylic denture as there are more procedures in the fabrication requiring expensive equipment. Because it is made of cobalt-chrome, it is a bit uncomfortable for the patient to wear, but only when starting to wear the appliance. As time passes the patient will become accustomed to the cobalt-chrome denture.

Due to being made of cobalt-chrome, this appliance is not suitable as a healing appliance. An important factor is the skill of the technician fabricating the appliance. If this appliance is poorly constructed the clasps can be abrasive to the teeth.
Implant-supported crowns

Advantages

- Aesthetically pleasing
- Excellent retention
- Excellent support

Disadvantages

- Very expensive

Implant-supported crowns are ceramic crowns that are screwed onto implants which have been placed in the bone. Depending on the skill of the technician, the crowns can be very pleasing aesthetically. The implants are firmly secured in the bone and therefore retention is excellent and the crowns are excellently supported by the implants. The implants, surgery and ceramic crowns are however very expensive.

Untreated

It is the right of the patient to not be treated. There are however consequences to this decision. Theses consequences are:

- Drifting of teeth
- Aesthetics will degenerate
- Discomfort
- Lead to bad habits
- Maxillary arch will eventually collapse
The canine serves as a border between anterior and posterior teeth. Without the canine teeth will drift, anterior teeth will drift into the posterior region and eventually due to the lack of teeth in the posterior region, the maxillary anterior arch will collapse. The aesthetics will only degenerate with time as the teeth drift. The patient will learn bad habits such as tongue thrusting. The patient can not really remain untreated in the face of these consequences.

Option chosen

The ideal prosthesis would be aesthetically pleasing, comfortable for the patient, durable and financially viable. The implant-supported crowns (figure 4) were chosen. The reasons for this are because it can be aesthetically very pleasing and in this case is financially viable. Fortunately the patient has enough bone support for the implants.

![Figure 4](image)

The 2nd Clinical Procedures

Two externally hexed implants were placed in the 13 and 14 regions. The implants were 15mm in length and 3.75mm in diameter. The implants were placed as is
standard. A bone collector was used to aspirate bits of bone from the drilling process. These bits of bone were then collected. After the implants have been placed, the collected bone was then placed over the implants to facilitate integration and healing. In figure 3 the implants have already been placed.

![Figure 3](image)

*Figure 3*

The implants were placed with the use of a stent. A stent was made to indicate the ultimate placing of the implants.

**Dental Technology Procedures**

The procedures followed in the construction of the transitional denture were the same as those for a standard acrylic denture:

- Wax-up done and ball-clasps positioned between the 25 and 26 and between the 14 and 15 for retentive purposes
- Denture flanked
Heat cure denture material used
Cured in a pressure pot
Deflasked and polished
Ready for placement

The procedures followed in the construction of the stent were also standard procedures:

- A thermoplastic material was used
- The thermoplastic material was heated and adapted to the model
- The model was vibrated to secure the material to the model
- I waited for the material to harden and removed it from the model
- Holes were drilled in the correct areas by the surgeon
Costs

- **Laboratory Costs:**
  - 2 Implants = R2690.40
  - Acrylic Denture = R260.00

- **Clinical Costs:**
  - Surgery = R17 (Tygerberg)
  - Surgery = R1932 (Private)
  - R17 per visit = R68 (Tygerberg)
  - R153 per visit = R612 (Private)
Conclusion

This case was a very standard case. The implants are currently in the process of integration and healing. After this period has passed, ceramic crowns will be constructed to be screwed onto the implants. The abscess that formed which caused the whole problem indicates that the technician has a very important job and must do that job as well he/she can.

The cobalt-chrome was a good choice, but was too dependant on the skill of the technician. The acrylic denture is an option, but if the financial resources are available, it would not be the best choice.
References


