



Management of Repeatedly Fractured Monolithic Zirconia Complete Arch Fixed Implant- Supported Prosthesis with Differing Implant Components



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INTRODUCTION

Complete arch fixed implant-supported prostheses (CAFIP) have been shown to be a successful treatment option for patients with terminal dentition or those already edentulous. Many prosthetic complications of this treatment option can be minimized with proper treatment planning incorporating adequate prosthetic space and proper fabrication of a passive final prosthesis. The brittleness of zirconia mandates that the design criteria provide adequate prosthesis thickness of at least 12 mm, adequate passive fit and the absence of long spans and cantilevers.¹ This case report describes a male patient who was successfully managed after suffering from a mandibular midline fracture of two monolithic zirconia prostheses supported by five dental implants from distinct manufacturers.

CASE REPORT

The patient, a 52-year-old male, presented in September 2021 with the chief complaint "I yawned and heard the bottom bridge crack." The patient had a history of severe bruxism and was not compliant with occlusal guard usage. At the time of patient presentation, the mandibular zirconia prosthesis was removed and a copy-milled PMMA prototype prosthesis was inserted eliminating implant #30. The prosthesis was also reinforced with metal pins and autopolymerizing resin. Prior to placement, the prototype prosthesis was verified for passive fit. Patient also received a temporary occlusal guard to wear with prototype prosthesis. Final zirconia prosthesis was inserted after a few months and patient was educated on the importance of regular occlusal guard usage.

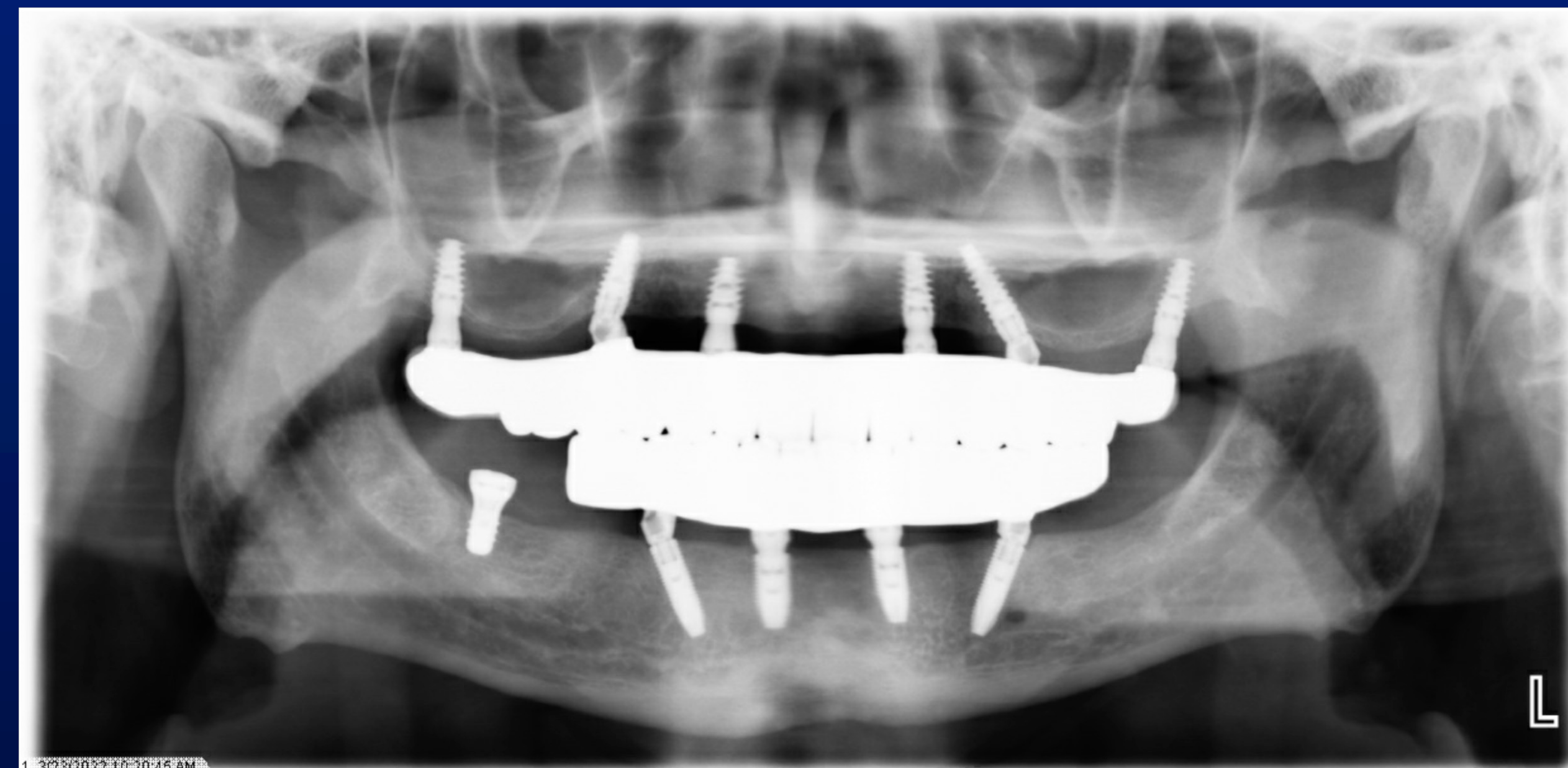


Figure 1. Panoramic Radiograph with final monolithic zirconia prosthesis.

Patient Treatment History

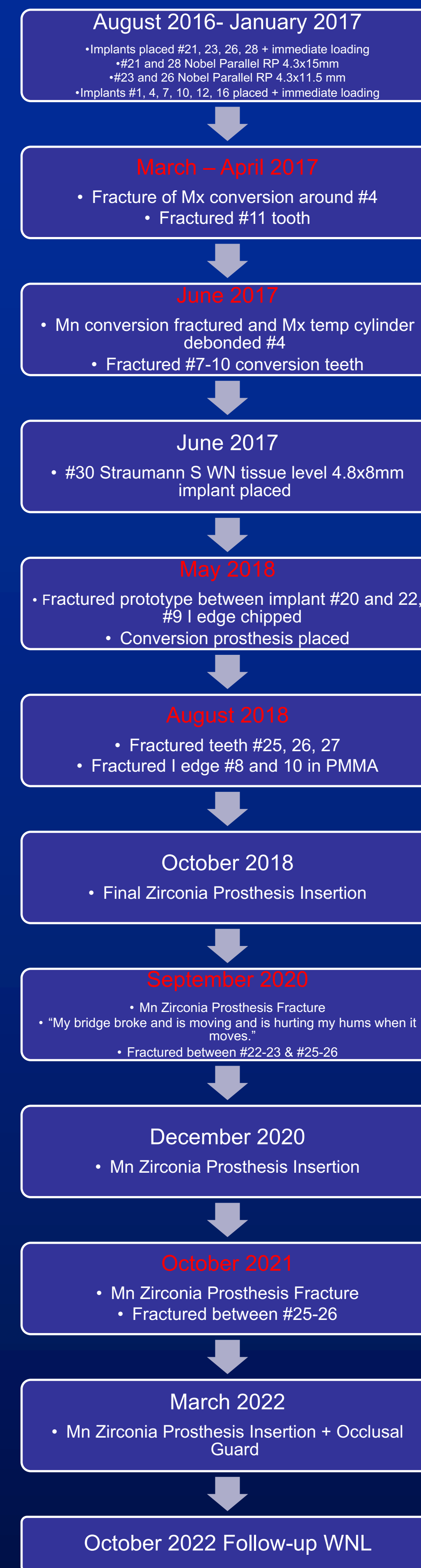


Figure 2. First fractured monolithic zirconia prosthesis between #22-23 & 25-26



Figure 3. Second fractured monolithic zirconia prosthesis between #25-26



Figure 4. Fractured monolithic zirconia prosthesis at temporary cylinder with adequate prosthetic space present

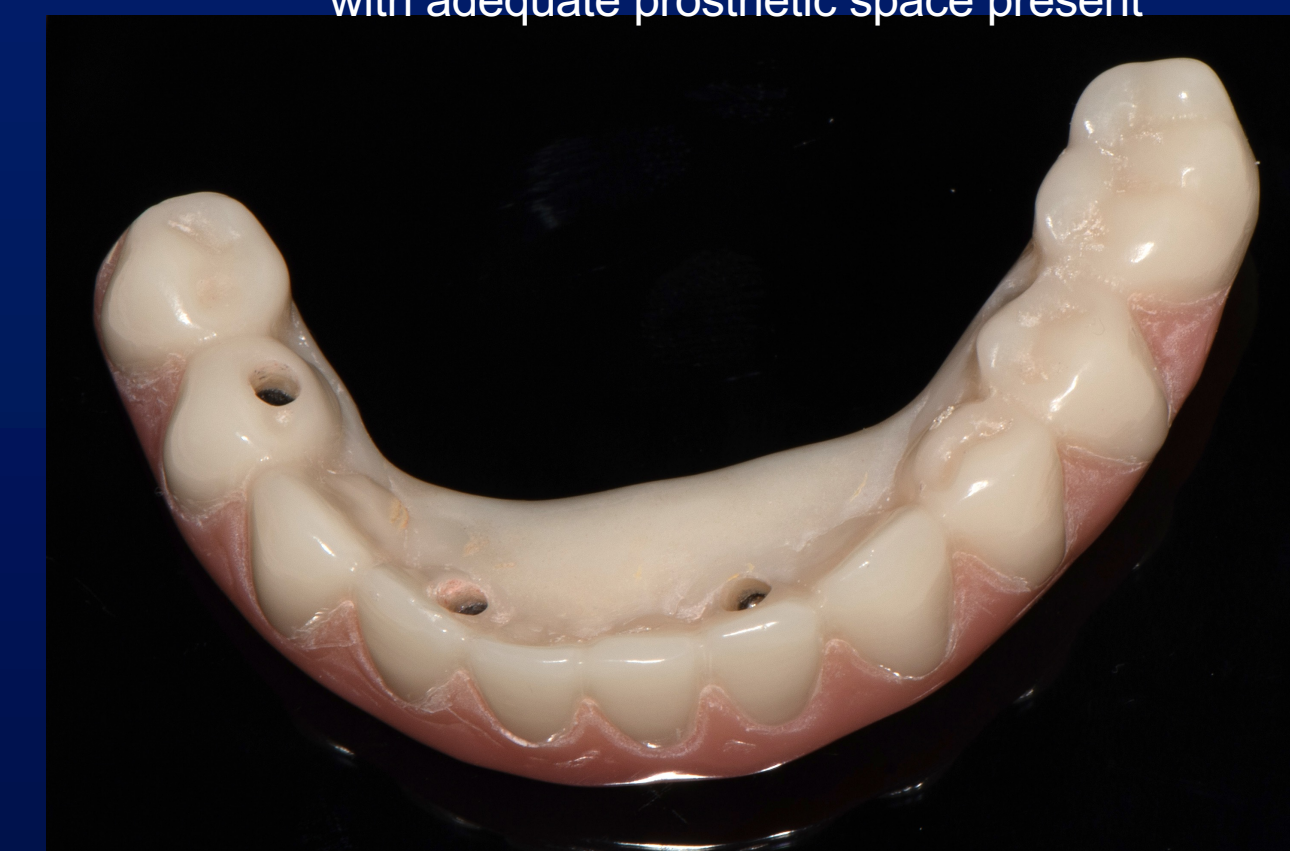


Figure 5. Reinforced copy-milled PMMA prototype prosthesis

CLINICAL CONSIDERATIONS

- Provide adequate thickness to final prosthesis.
- Verify passive fit of prosthesis and address any potential misfit which may be attributed to diverse prosthetic components with different connections.
- Consider eliminating the distal implant in situations with repeated fractures to rule out the potential effect of mandibular flexure.
- Stress the importance of managing parafunctional activity and strict occlusal guard usage.

CONCLUSION

- The initial fracture of the mandibular prosthesis that occurred September 2020 was attributed to inadequate final prosthesis thickness around cylinders and misfit due to diverse implant components. The subsequent fracture of the mandibular prosthesis which occurred October 2021, is theorized to have been a result of inadequate prosthesis thickness around cylinders, patient's parafunctional habits and lack of occlusal guard usage, and/or mandibular flexure.
- Mandibular flexure is an important consideration in this patient but could not be attributed to a direct etiology in the presence of severe bruxism and prosthetic design issues.



Figure 6. Final monolithic zirconia prosthesis with shortened dental arch



Figure 7. Occlusal guard insertion.



Figure 8. Patient smile with final monolithic zirconia prosthesis.

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