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# Case report: comprehensive treatment of rampant dental caries

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A healthy 15-year-old Caucasian female presented at the Faculty of Dentistry, University of Toronto, for treatment of her mutilated dentition (see Figure 1).

Her oral health was very poor with a disease level that presented an unusual challenge for a dental student. This condition was the direct result of poor oral hygiene and high carbohydrate consumption during childhood. Reconstructive treatment consisting of routine amalgams and resins (for the mandibular teeth) as well as extractions of teeth no. 17, 16, 15, 27 and 46 had been previously performed.

There were many psychological overtones influencing the patient's decision to seek dental treatment, including difficulty in making new friends and, the primary reason, being teased about her teeth. Conflicting familial advice had leaned towards extraction of all maxillary teeth as a viable treatment solution since both parents were satisfied denture wearers.

However, after prolonged discussions and consultations with all parties, this approach was rejected as too radical with unfavourable, irreversible consequences. It was replaced by a more conservative route involving endodontics and fixed prosthodontics.

## Evaluation of patient

Study models were mounted on the Hanau 130-30 semi-adjustable articulator (Figure 2). The information ob-

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Dr. Kryshchalskyj was a senior dental student in the Faculty of Dentistry, University of Toronto, when this project was completed.

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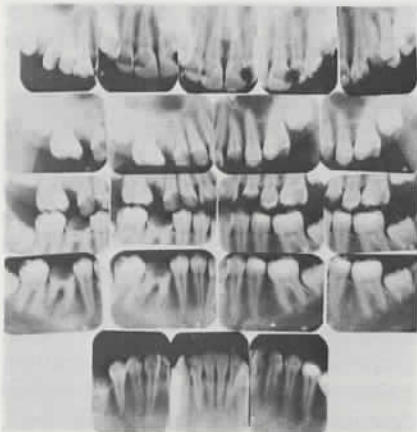


Figure 1: Bite wing and periapical radiographs at age 15.



Figure 2: Models of the same patient at age 17.

tained was confirmed by clinical inspection. For purposes of this article, emphasis is placed on the maxillary dentition.

**Mutilated tooth form:** Teeth no. 14, 13, 12, 22, 23, 24, 25 were eroded to the gingival line, while no. 21, 11 exhibited extensive class V carious lesions encompassing over one half of the clinical crowns and extending subgingivally. This decay presented as black discolourations which were prominently displayed when the patient smiled. These were of a semi-hard consistency which could be partially excavated with the use of hand instruments.

**Occlusion:** Four contacts were noted in centric occlusion (CO) involving the remnants of teeth no. 13, 23, 25 as well as the newly erupted no. 18. In

TABLE 1

## Summary of radiographic analysis

Tooth	Root	Crown root ratio	Apical thickening	Lamina dura presence	Sclerosing osteitis presence	Rarefying osteitis extent	Caries extent	Required endodontic treatment
14	2	1:5	-	-	+	-	++	+
13	1	1:4	+	apex	+	+	++	+
12	1	1:5	+	apex	+	-	++	+
11	1	1:2	-	apex	-	+	++	+
21	1	1:2	-	-	+	-	++	+
22	1	1:5	-	apex	-	+++	++	+
23	1	1:4	-	-	+	-	++	+
24	2	1:4	-	-	+	-	++	+
25	2	1:5	+	apex	+	+++	++	+

contrast, only two contacts were apparent in centric relation (CR) involving teeth no. 25 and 23.

There was a 1.5mm CR to CO slide, to the left, upon maximum closure. Units 24, 25 were in crossbite, and anteriorly a 40% overbite was present in combination with a 4mm overjet in CO.

In the dynamic movement, it was noted that protrusive function was symmetrical from CR while right lateral excursions were suggestive of group function occlusion. In contrast, left lateral movements demonstrated cuspid guided occlusion.

**Periodontal status:** The remaining teeth did not show infrabony pocketing or furcation involvements.

**Temporomandibular Joint (TMJ) status:** Symptoms of TMJ dysfunction were prevalent in the form of bilateral clicking and crepitus of the joints especially on excessive opening. Mild lateral pterygoid muscle tenderness was also evident, bilaterally.

**Radiograph assessment:** In view of the extensive caries involvement, any suggestion of periodontal pathology was regarded with high suspicion (see Table 1).

#### Treatment considerations

In determining a practical treatment approach, several factors were considered. Firstly, the patient's dentition was functionally inadequate (resulting in TMJ dysfunction). Equally significant was the aesthetic component which was far from ideal; treatment

was complicated by psychological variables.

Secondly, positive requirements for restorative procedures included the existence of favourable periodontal support for teeth no. 14-25 (a necessity for endodontic therapy and subsequent post-core placement) as well as an improved intraoral environment for after treatment maintenance of the restored dentition. The latter was ensured in that the causes of the original condition had been circumvented with improved oral hygiene and diet control.

Thirdly, the hazards of no treatment were evaluated. These included: perpetuation of TMJ dysfunction; continued dental and psychological deterioration; and, on a local level, progressive supra-eruption and shifting of opposing teeth. Lastly, the parents and patient had become convinced that a removable prosthesis was not the treatment of choice.

The primary goal was to reconstruct the maxillary dentition functionally and aesthetically to an idealized mandibular arch. This involved bilateral group functioned occlusion with harmonized anterior guidance to permit posterior disclusion in protrusive excursions.

#### Method of treatment

**Sanitary phase:** The value of good oral hygiene cannot be overemphasized in this type of restorative undertaking. The patient had demonstrated proficiency in maintaining her improved periodontal health. An occlusal adjust-

ment was performed to harmonize the mandibular arch to follow the principles of tooth form. In addition, endodontic treatment had been initiated on teeth no. 13, 12, 11, 21, 22, 23, followed shortly by endodontic treatment of no. 14, 24, 25.

**Diagnostic phase:** This stage commenced with the transitional restoration of the anterior maxillary teeth. To restore the lost vertical dimension (which was observed during occlusal analysis), it was necessary to rebuild the bicuspid occlusal segments by 1mm.<sup>1</sup> A diagnostic wax-up was done utilizing the few landmarks available on the models of the mutilated maxillary arch. This attempted to simulate the original form of teeth no. 13-23 on a properly mounted hinge articulator (see Figure 3). An acetate mould was derived from this template which permitted the fabrication of a 6-unit interim splint (13-23).

A one-month diagnostic interval determined patient comfort with this prosthesis. Within this time period, endodontics had been completed on teeth no. 14, 24, 25. Subsequently the original diagnostic wax-up was expanded to include these teeth as well as the regenerated, accepted vertical dimension (see Figure 3).

The original temporary was altered accordingly. It consisted of three segments (14, 13-23, 24-25), which now provided a transitional model of the maxillary arch incorporating bilateral group functioned occlusion while retaining the identical anterior guidance established previously (see Figure 4). This was maintained for an

additional month during which time the patient experienced a very noticeable change—specifically that of diminishing clicking and crepitus. Tenderness to palpation, of the lateral pterygoid muscles, had also subsided. Masticatory efficiency greatly improved as the patient was now able to function on her posterior teeth again. This was something she had avoided previously.

Upon completion of this stage, the maxillary arch was now restored with a diagnostic splint to the functional capacity hoped for in the permanent result (see Figure 4).

**Reconstruction phase:** This stage differs from the previous stage only in the gradual replacement of the accepted temporary diagnostic splint with its permanent counterpart.

It was very important to obtain accurate interocclusal recordings to facilitate optimal results. For this reason, the anterior section of the transitional diagnostic splint (13-23) was treated as a permanent landmark for impressions of the posterior tooth preparations. It was stable, comfortable and therefore highly dependable for this purpose.

The sequence of permanent reconstruction entailed cementation of post-cores on teeth no. 14, 24, 25 followed by restoration of no. 24, 25 with porcelain bonded to metal (PBM) crowns. Insertion of a 3-unit PBM bridge (14-18) completed the posterior reconstruction to bilateral group function occlusion (see Figure 5).

A customized anterior guide table was prepared on the incisal table of the Hanau 130-30 semi-adjustable articulator to preserve the anatomy of the anterior guidance as recorded on the remaining temporary splint (13-23). This provided the laboratory technician with information to permit duplication of this time tested functional record. Restoration of the anterior teeth no. 13, 12, 11, 21, 22, 23 followed, with post-cores and individual PBM crowns (see Figures 6, 7, and 8).

A final occlusal evaluation and equilibration procedure was carried out. The patient was then placed on a three-month recall program in order to adjust any possible future minor interferences<sup>1</sup> and especially to evaluate and reinforce oral hygiene maintenance.

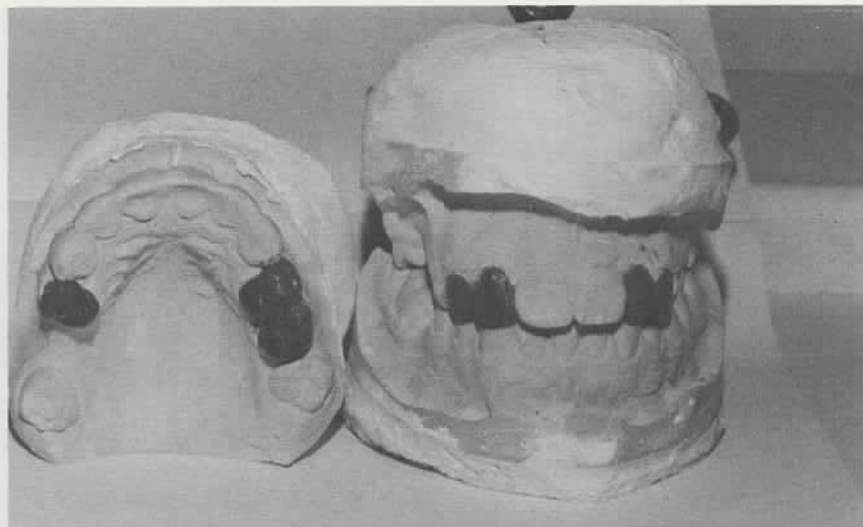


Figure 3: Diagnostic wax-up using a hinge articulator.

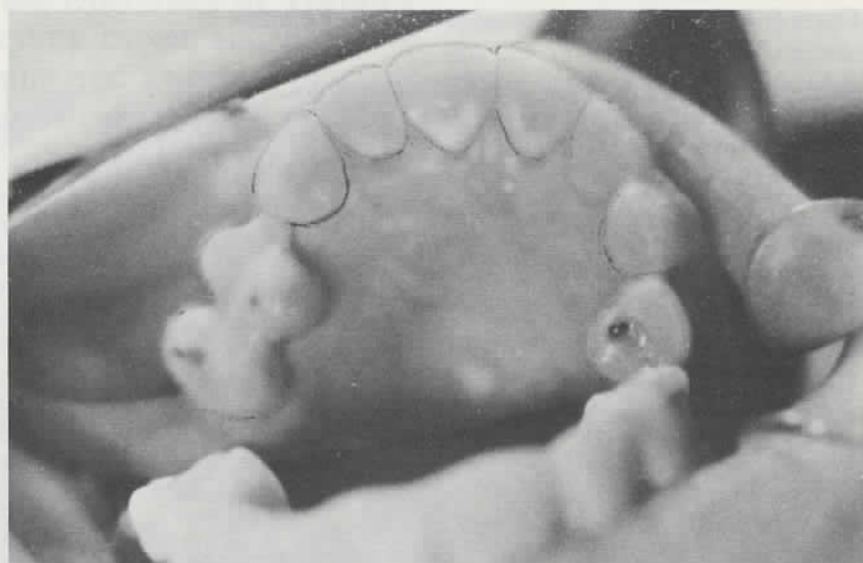


Figure 4: Temporization of the maxillary arch.

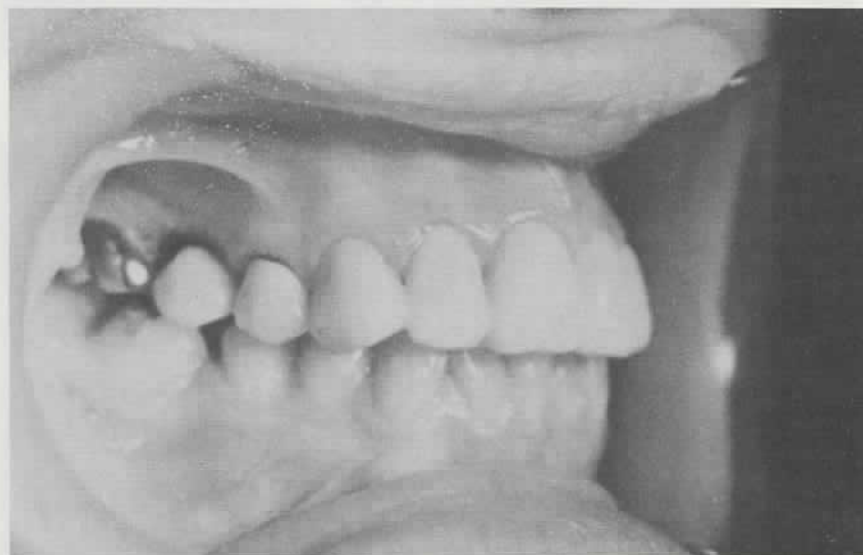


Figure 5: Completion of posterior segment reconstruction utilizing the temporary splint.

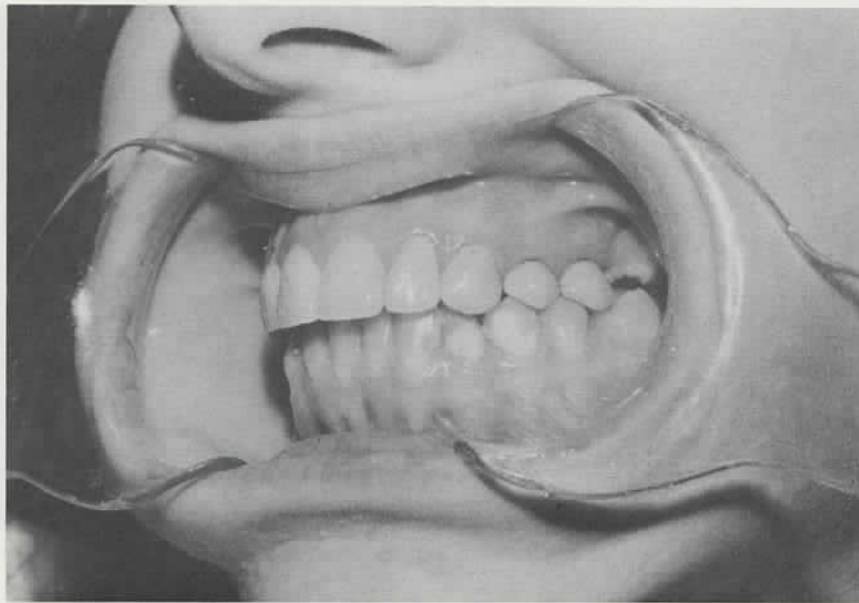


Figure 6: Left profile view of restored maxillary dentition.



Figure 7: Palatal view.



Figure 8: Comparison of pre and post treatment radiographs.

### Results successful

An extensive reconstructive treatment plan has been presented to completion. It provided a very satisfactory end result and gave the patient a second chance with her original dentition.

It must be emphasized that case selection is extremely important in this type of restorative venture. Had the source of the initial destruction lingered on, it would have doomed this complex treatment result to failure. Therefore, patient cooperation is mandatory and encompasses the realms of sound oral hygiene and diet control.

It is always good to review one's own work and look for areas of improvement. The region of concerns focuses on the lengths of the cemented post-cores. Presently they are within the limits of acceptability. Ideally, they should have extended two-thirds to three-quarters of the root length.<sup>2</sup>

### Acknowledgement

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