Treatment of the worn and spaced dentition – An ultra-conservative, multidisciplinary approach

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Tooth surface loss (TSL) can present in various clinical forms and has a wide range of aetiological factors. Dental erosion, attrition and abrasion are commonly observed by general practitioners, the first two often being seen in younger patients. The superimposition of TSL and malocclusion and/or tooth size and position discrepancies can compound the problem because of the coincident loss of form, function and aesthetics. It can also create difficulties in planning treatment options, with treatment strategies having to be drawn from multiple disciplines and integrated harmoniously to achieve long-term success. There are also other important issues to consider, treatment of tooth wear involves altering the vertical dimension of occlusion (VDO) and orthodontic treatment alters the position of the teeth, both often complex, lengthy and high cost procedures in their own right, neither must be done in isolation if the patient is young and the cost of ideal treatment can be prohibitive and they may expect long-term longevity from the treatment provided and materials used. These are conflicts which probably will require some form of compromised treatment being embarked upon. It also needs to be borne in mind that the protection of valuable remaining natural tooth tissue is sacrosanct and this puts pressure on the ethical practitioner to be as conservative as possible. It is crucial to assess the patient in these cases to ensure that the patient is fully aware of any compromises chosen, the reasons behind the decisions made and to involve them in the decision making process itself. Fortunately with the advent of modern hybrid nano-composite materials and innovative orthodontic and dental treatment techniques, treatment can be designed to be progressive in nature, with patient directed treatment and success can be achieved at the strictest level of treatment, for all spectrums yet can evolve to encompass more complex restorative work involving dentistry, in a definitive and timely manner if required. All of these factors had to be considered in the case presented here.

Case Study

The case study illustrates a simple multidisciplinary approach through the use of occlusal therapy combining centric relation direct composite build-up of worn occlusal surfaces of upper and lower molars and premolars in order to re-establish comfort and acceptable VDO. The resulting increase in occlusal plane was utilised by reTRACTing the spaced, severely worn upper incisors with removable aligner (IAS Inman Aligner and IAS Clear Aligners). This enabled aesthetic restoration without the need for invasive reduction by placing direct labial nano-hybrid composite veneers using a modified (untrimmed, full adhesive strategy) and a clear ma-trix technique described by AlZahra. The patient was seen for Inman treatment when he was 32 years old, complain-ing of unjustifiably gaps between his front teeth. There was a relevant family history as he had an identical twin brother who also had a spaced anterior dentition. He had been presented with a reduced lower face height. Intrarural examination showed evidence of moderate occlusal wear through to dentine occlusally on several upper and lower molars and premolars. The upper incisors were severely worn and had lost almost half of their clinical crown length. Microdontia was ruled out, but the presence of diastemata indicated an insulation between the jaw size and the size of the teeth. There was no serious frenul inter-relation. The palatal surfaces of the upper incisors and the edges of the lower incisors were reasonably intact and there was a class I incisor relationship and no deep bite. The palatal surfaces of all the teeth were unworn and tilted slightly labially. It was pos-sible to identify the anterior slide of the mandible, functional contacts on the posterior teeth and an absence of anterior guidance. There were no dietary abnormalities yet neither was he aware of any brush-ast habit, although he admitted a severe nail biting habit. A diagnosis of anterior premature attrition in the presence of unfavourable canine geometry seemed to correlate with non-tooth contact parafunction was made. The patient vanished for two years, then returned, eager to commence treat-ment. Study cast comparison was able to demonstrate that there had not been any appreciable change in the clinical situation during that time, possibly attributable to a de-reasing in the rate of wear over time, as the surface area of the teeth in contact increased.

Aims of treatment

1. To create a mutually protected occlusion where the anterior teeth disclude the posterior teeth in all excursive movements of the mandible.
2. To avoid any preparation to the teeth whilst providing treatment according to sound biomechanical principles.
3. To prevent further pathological wear of all teeth and to cover all exposed dentine.
4. To secure the position for life the positions of the upper incisors after orthodontic movement.
5. To improve the aesthetics and re-store the patient’s confidence in the appearance of his smile.
6. To perform the treatment in a sensor- tive time frame and as cost effec-tively as possible.

Treatment plan

Four Phases

1. To establish a stable posterior occlusion at an increased VDO using centric relation and simple direct composites bonded onto the occlusal surfaces as an occlusal deporption to discourage the anterior slide and allow the mandible to go back. This would take approximately 30 days.
2. To retract the upper anterior teeth with removable aligners by a sufficient amount to enable their subsequent restoration to aesthetically acceptable mesio-distal dimensions and to create interproximal contact, but not so much as to encounter a problem with soft tissue clearance. This would take approximately three-four months during which the teeth would be accommodated to discourage the anterior slide of the incisors during the next phase.
3. To recreate the incisal anatomical form using direct nano-hybrid composite labial veneers. Precision in form will be assured by using a full clear silicone stent made over a diag-nostic wax-up, with the wearing of a pre-evaluative temporary to assess patient comfort and satisfaction. To retain the teeth in their new positions for life using a palatal wire bonded retainer locked into the com-pose- tive veneers for added flexural strength.
4. To securely retain for life the positions for life using a palatal wire bonded retainer locked into the compos- tive veneers for added flexural strength.

This will also create space for the or-thodontic phase.

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Discussion

The treatment proved to be a success, cost effective choice for the patient, primarily due to accurate planning, realistic expectations, good compliance and avoidance of excessive laboratory fees. At six months reform, there is no evidence of marginal breakdown of the composite and the wire is still bonded and preventing relapse. The palatal wire is now established and can be copied later if a move to ceramics is ever considered. In this type of additive
The flexural strength of an incisor comes primarily from the labial and the palatal enamel, which was left intact in this case. High-strength composite bonded over both the unprepared labial and palatal enamel surfaces gave an optimal biomechanical result as the flexural strength of the incisors will have been substantially increased. This should reduce the chances of marginal breakdown of the composite in the long term. To further reduce flexural stresses on the upper incisors, the small ledge created by the bonded wire acts as a vertical stop for the lower incisors to occlude against, favourably transmitting forces down the vertical axis of each tooth.

The psychological impact of the treatment has been substantial. There was a total transformation of his appearance and smile, with a noticeable effect upon the patient’s self-confidence. The patient’s identical twin has followed his brother’s treatment closely and it is looking like I might need to repeat the process all over again! If not, we have a good control subject for the future in order to observe what might have happened had my patient not had this treatment.

References