Utilising a combined restorative and orthodontic approach to correct occlusal and aesthetic issues

Ilan Preiss BDS winner of the 2009 Smile Awards Restorative smile category, presents his case report

Presenting condition

The patient presented to the practice in acute muscular discomfort, with a history of chronic TMJ and muscular pain in and around the joint. She was a 31-year-old female in the dental profession and was looking for an enhancement in her smile, whilst improving her ability to chew.

In addition she felt unhappy with the appearance of her lower teeth and felt they looked crooked and over crowded. In photos the patient would not smile in full-face photographs since she was very embarrassed by how the teeth looked therefore, in the pre-op photo she is not showing any teeth (Figure 1).

Prior to seeking treatment with us she had seen another dentist who had tried to lengthen her centrals with composite to aid with relief of her bite problems, however this had not fully worked and the dentist had also carried out the first stages of an equilibration yet she was still in a lot of discomfort.

Baseline monitoring

A detailed oral health evaluation was carried out and periodontally there was no significant issues bar slight supra gingival calculus and mild gingivitis. No pockets were greater that 3mm.

Ilan Preiss BDS qualified from Leeds in 1998 and has been working in London in private practice since 2000. Ilan has been part of the award winning Bow Lane Dental practice since 2002. He has been nominated for many dental awards, winning the 2009 Restorative Smile Of The Year Award at the prestigious Smile Awards. He has attended many occlusion and cosmetic courses around the globe and is a member of the BACD and ADI as well as many other organisations. He is currently working with 3M lecturing on LAVA crowns and is one of a select group of dentists in the UK to be using and lecturing on the Lava Chairside Oral Scanner. He can be reached via email : ilan@bowlanedental.com

No decay was noted and oral cancer screening was negative.

A careful and thorough examination of the TMJ and surrounding muscles showed up the following.

- Tenderness from joint on opening both when pressure placed on joint and without.
- Inability to load joint without pain
- Limited opening
- Tenderness from left and right medial pterygoids, trigger point tenderness elicited from left temporalis and left masseter. The remaining muscles felt slightly sore.
- Large centric relation to centric occlusion slide, with a large vertical small horizontal slide.
- Large numbers of working and non working side interferences both in left and right movements.

Study models and facebow were taken and a centric bite was taken with the aid of a lucia jig and using bimanual manipulation. Careful analysis of these models with the technician and orthodontist led to the following treatment option.

Cosmetic exam (see Figure 2)

- The centre line was off to the left and non coincident upper to lower teeth.
- There was a cant from the left to rig ht.
- Gingival levels and zeniths of upper anterior teeth were not in the ideal positions with the left side being higher than the right.
- High smile line was noted.
- Incisal edge position was short and the crown height to width ratios was not ideal.
- 11, 21, 12, 22 were not symmetrical and the height to width ratios of these teeth were not symmetrical
- Golden proportion was not correct since the 13, 23 were in the wrong position.
- The buccal corridor was too narrow on both sides and so in full smile the teeth distal to 13,23 could not be seen properly
- Incisal embrasures were not developed enough, but especially on the left side.
- The colour and incisal translucency caused by the placement of the composite additions have left the teeth looking unnatural and stained.
- Crowding of lower anterior teeth

Treatment options discussed

After carefully explaining occlusal disease and the link with the joint and muscles, we advised that before placing any restorations on the front of the mouth we would have to improve the condition of her joint and muscles. In addition we spoke of veneers versus crowns for the front teeth. Since over 30% of the tooth height had been lost and replaced with composite and since we still needed to lengthen incisal edge further, and control the palatal contour for anterior guidance, crowns would be a better option.

Since she had a high smile line, lava crowns were chosen for the natural look and ability to blend cervically with the surrounding tissues.

Phase 1

Stabilise bite and joint and insure muscle symptoms decrease. This would be carried out with an upper hard occlusal splint, initially worn as much as possible with numerous adjustments over a number of weeks. A positive response was immediately noted by the patient and the acute pain was relieved.

Phase 2

New bite taken in centric relation since the muscles and joint were more relaxed and analysis for an equilibration carried out. Equilibration of the teeth to remove the slide between centric relation and centric occlusion was carried out, as well removing some of the interferences in lateral movements. However since orthodontics would be carried out to adjust the position of the canines the remaining equilibration would be carried out at a later date.

Phase 3

Lingual fixed upper and lower orthodontics was carried out (Figure 3). Fixed orthodontics to align the lower teeth so aesthetically better as well as improve the anterior guidance. Widening of the buccal corridor in the upper teeth and improve the cant that is on the upper teeth, in addition to improving the position of the canines to aid with lateral guidance. Correct gingival heights of upper anterior teeth were also achieved.

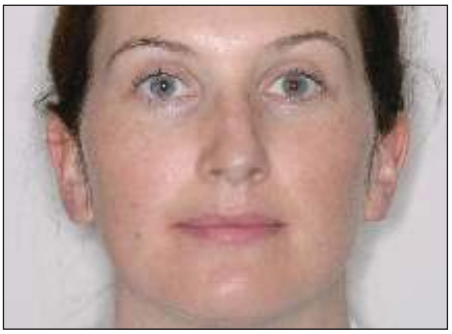

Figure 1: Full face pre-op

Figure 2: Full smile pre ortho and restorative work

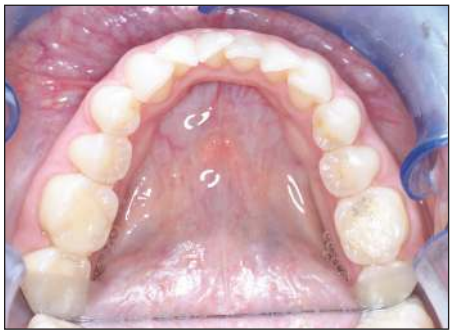

Figure 3: Lower occlusal view pre-ortho

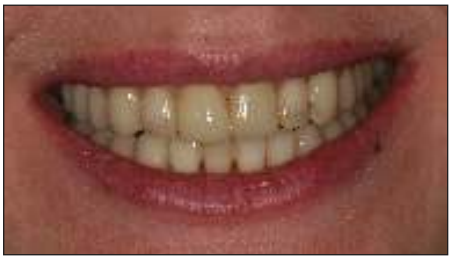

Figure 4: 1 to 2 smile anterior view post ortho (please note widening of buccal corridor and improved gum positions)

Figure 5: 1 to 1 retracted anterior left pre-op

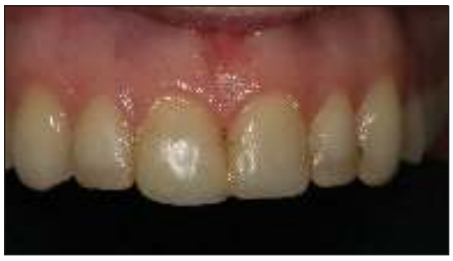

Figure 6: 1 to 1 retracted anterior pre-restorative stage

This phase took one year and was carried out by Dr Asif Chatoo (orthodontist).

Phase 4

New study models were taken and mounted with a centric bite. Careful history showed all joint and muscle pain had been resolved and full range of movement was noted.

Full mouth photographs were taken and analysis of these in addition to occlusal requirements led us to design the anterior crowns at the correct incisal edge as well as correct palatal anatomy for guidance.

A diagnostic wax up was constructed and 13-23 waxed up to full contour for crowns. The wax up was designed to meet the above criteria. A full discussion about colour and characteristics of the crowns was undertaken with the patient and technician. The patient really wanted a natural look with translucency and to blend them with her natural teeth.

Phase 5

Minor equilibration was carried out to insure light centric stops in all the correct places and no lateral interferences. Preparation of 13, 12, and 11,21,22,23 for lava crowns was undertaken. Impressions were taken and chairside temporary crowns were made, based on the diagnostic wax-up. Facebow and stick bite were also taken. Two weeks later the laboratory made acrylic crowns which were fitted. The patient was tested over a three month period for function and form as well as all speech issues, to insure that the crowns were within her envelope of function. In addition, the laboratory sent off for the Lava 3M copings for the permanent crowns. Once the patient and I were happy, we took pick up impressions of the Lava 3M Copings with the surrounding periodontal tissue in the ideal natural position.

The laboratory processed the Lava crowns and copied the temporary crowns which had been very well tolerated. These were ce-

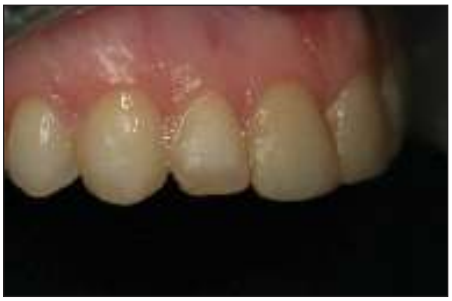

Figure 7: 1 to 1 retracted anterior right

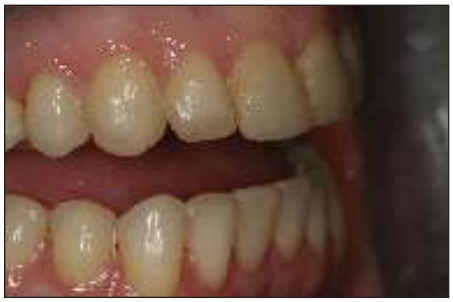

Figure 8: 1 to 2 retracted right pre-restorative stage

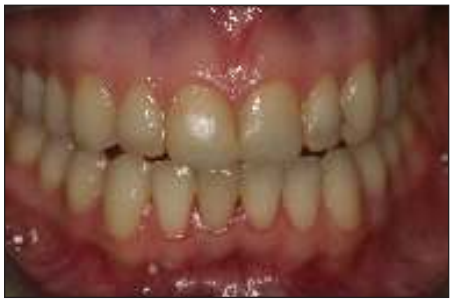

Figure 9: 1 to 2 retracted anterior pre-restorative stage

Figure 10: 1 to 2 retracted left pre-restorative stage

Figure 11: Lava crowns

Figure 12: 1 to 2 smile view post op anterior

Figure 13: 1 to 2 retracted anterior post op

Figure 14: 1 to 2 smile view right side post op

Figure 15: 1 to 2 smile view left side post op

Figure 16: 1 to 2 retracted left side post op

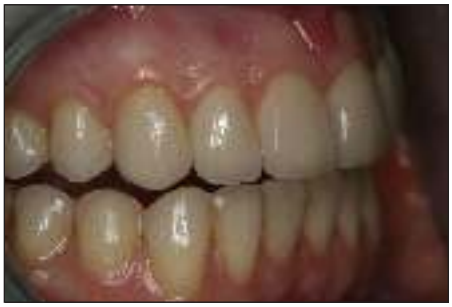

Figure 17: 1 to 2 retracted right side post op

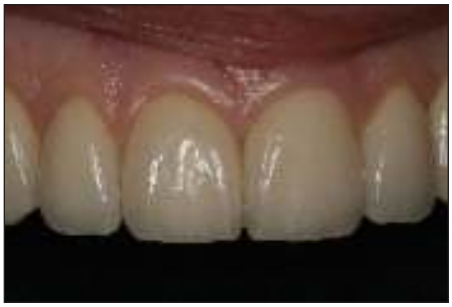

Figure 18: 1 to 1 retracted anterior post op

mented after approval from the patient with RelyxUnicem (3M espe) (see Figure 11). All occlusal movements in anterior and lateral excursions were checked and insured contacts were even (Figures 12 -23).

Phase 6

Owing to the fact that the patient had a habit of grinding, I felt it was prudent to protect the porcelain, protect the joint and maintain crowns in the position we placed them by constructing a night time upper occlusal splint. In addition the lower anterior teeth had a permanent retainer left to keep these teeth in the post orthodontic position.

Conclusion

We felt that the treatment carried out was a great success on many levels and exceeded all of the patient's expectations. She was free of pain, and her bite is in a stable position that will remain this way. In addition she has a beautiful smile to compliment her natural jovial nature (Figures 24-27).

She is proudly showing off her new smile, and we are delighted to have helped her. This case required very careful management of her

Figure 19: 1 to 1 retracted left side post op

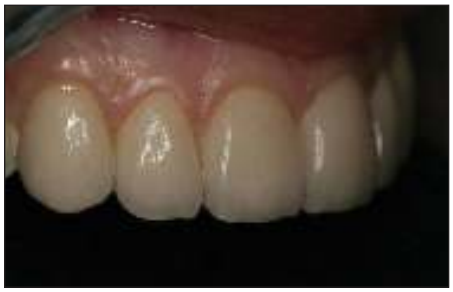

Figure 20: 1 to 1 retracted right side post op

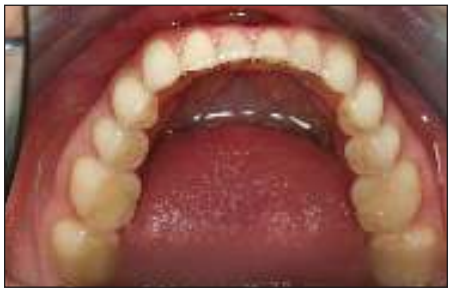

Figure 21: Lower occlusal view post op

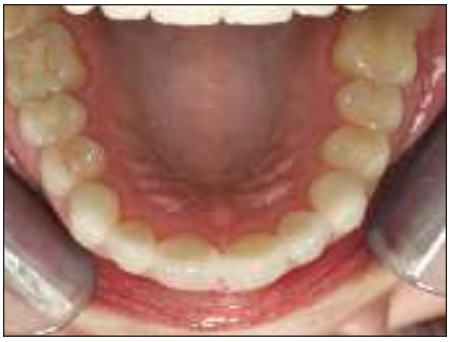

Figure 22: Upper occlusal view post op

Figure 23: Full face post op

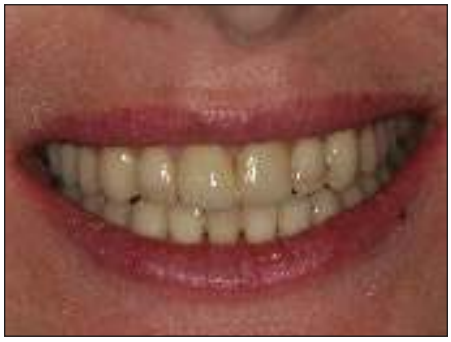

Figure 24: Pre-op smile

Figure 25: Post-op smile

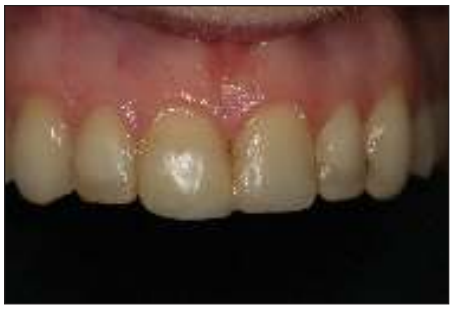

Figure 26: Pre-op close up

Figure 27: Post-op close up

occlusal scheme. We then matched this to her final restorations creating beautiful natural results aesthetically, as well as relief of pain from muscles and joints.

Acknowledgements

I would like to thank my technician Atsuyoshi Kakinuma for his fabulous ceramic work and Dr Asif Chatoo for his invaluable help with the orthodontic aspects of this case.

References available on request. A