Veneers integrated with Invisalign - a contemporary restorative option

Trent W Smallwood

Introduction

Historically, contemporary restorative practices rarely co-existed with traditional orthodontics when treating complex occlusal schemes or managing elevated patient expectations. These two treatment modalities stood largely separate from one another save for in the most austere instances and even then, invasive oral surgery was often integrated as well. As orthodontics has progressed over the years, a new genre of orthodontic technology evolved in the late nineties: the clear alternative to traditional orthodontics emerged and Invisalign (Align Technology) technology appeared on the horizon, changing the way we contemplate altering the position of one's teeth. Orthodontics and restorative rarely coincided on the same patient simultaneously thus causing often more aggressive treatment alternatives. Usually limited to only the most undaunted of dentists, these few realized that the two monumental treatment modalities could be integrated if masterfully planned and coordinated and yet, it is was rarely utilized or practiced. The advances within both disciplines have afforded a new and innovative way of considering and delivering conservative dentistry to patients. Aggressive preparation is no longer necessary to achieve a desired result. With thorough patient understanding, patience and the desire to achieve the best dentistry has to offer, the potential is boundless.

For years, if a patient desired 'instant Orthodontics' (restoring of anterior teeth using porcelain versus orthodontically moving teeth to achieve a comparable result), the treating dentist was often forced to crown all involved teeth, depending on the initial malposition. Due to this aggressive approach, mechanically induced root canals, elongated coronal heights/lengths, inconsistent axial inclination, and erratic periodontal zeniths/heights were inevitable in many instances. Aggressive preparation was a mainstay previously and the initial notion of 'veneering' a tooth gave way to an inevitable crown more often than not, as the preparation sequence progressed.

With the development of more advanced porcelains available to the enlightened dental professional today, the hopeful perception of attaining a natural smile is very much realized and more realistically attained. Aesthetic materials were often limited to porcelain fused to metal crowns and over-contoured facial composites to achieve some semblance of aesthetic improvement. Philosophies such as the Golden Proportion and the Platinum Paradigm[1] have paved the way to better overall aesthetics using both soft and hard tissue. The understanding of important aesthetic concepts such as Axial inclination of teeth, optimal gingival harmony, facial anatomy and line angles, polychromatic gradation of color and shading, and contact zones is imperative to achieve the desired result for today's enlightened consumer. Empress Esthetic (Ivoclar Vivadent) has led the way for years in the realm of exemplary aesthetics and procuring a naturally aesthetic outcome for a smile.[2] With the beautiful and natural aesthetics available in today's porcelains, there is no excuse but to provide optimum treatment for patients. Beauty and longevity are paramount in crafting today's smiles but often gave way to invasive preparation techniques to achieve the desired result.[3] The fate of the teeth, historically, no longer has to be the case.

Initially, Invisalign technology was primarily limited to elementary bodily tooth movements and nominal tipping, if desired, and restricted to only the most uncomplicated of cases. In the last several years, however, with over one

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Figure 1: Tooth in its initial state before preparation and/or movement.

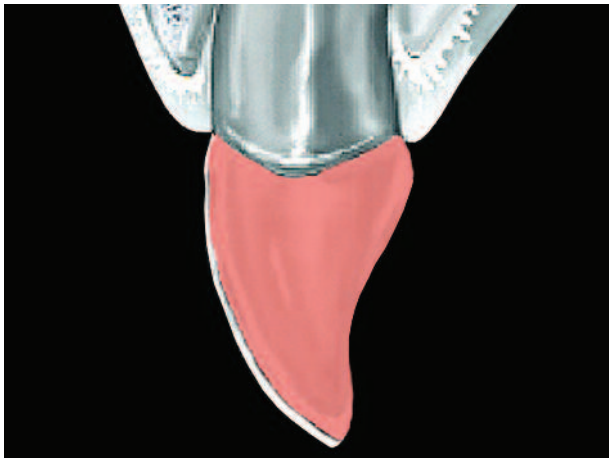

Figure 2: Post Invisalign Phase. Note the 3-degree retroclining of the tooth and that it doesn't inhibit the envelope of function.

million cases completed to date, Align has increased their range of complexity in the cases treated. This has presented an interesting opportunity for the professional wanting to expand their scope of treatment and striving for more non-invasive techniques to add to their product range, thus uniting contemporary orthodontics with that of advanced restorative techniques and materials. If properly managed and planned, there can now be a use for Invisalign technology followed by conservative preparation utilizing Empress porcelain.[4] Utilizing Invisalign to orthodontically re-position the desired teeth to near-ideal, followed by conservative preparation/placement of restorations to achieve an optimum smile, should be considered in today's modern practice. If properly planned, the synergistic approach in using Invisalign aligners and porcelain to frame a beautiful smile is predictable in its outcome.

As one can imagine, thorough discussion of this concept to the patient is essential to contribute to their understanding of this multi-disciplinary approach to contemporary unobtrusive dentistry. Do to the fact that the public has accepted 'instant orthodontics' as a common treatment option; many must be re-educated to that of a more conservative alternative approach to treatment. The technique involves a primary phase of treatment entailing the use of Invisalign aligners to achieve, fundamentally, the 'near ideal' position of the teeth before commencing with the final restorative element (Figure 1). It must be established that there will be a two-phase strategy whereby Invisalign will commence initially, followed by restorative phase of the desired teeth. With this phasing, establishing the number of teeth is imperative for the continuity of the treatment phase. It is critical that the patient understands, when utilizing this technique, that the two phases cannot be dissociated from one another and the patient and doctor must have the commitment to see the treatment through to its resolution. Using Invisalign to move the teeth can be accomplished in a relatively short time period (average range of 3 – 12 months depending on complexity) to accommodate the restorative options to follow. Traditional orthodontic appliances should be considered for advanced cases needing more than 12 months to complete. This is suggested to increase success rate and predictability.

Consider the Benefit

If the desired teeth were aligned to that of a conceptually ideal position, emulating an optimum position to ensure a pristine aesthetics outcome with restorative methods available today, why wouldn't a restoring dental professional consider such a clinical alternative? All of this can be completed in a reasonably short time period. In addition, the teeth being restored will possess a rejuvenated and

Figure 3: Clincheck technology is the Pre-orthodontic position of teeth

Figure 4: Pre-orthodontic position of teeth in patient 1:10 face shot. After 2 years of traditional braces and relapse. Bilaterally missing lateral incisers.

youthful look and all other teeth not restored by porcelain will have been orthodontically repositioned to a more ideal position, thus improving the overall health, function, and aesthetics of the teeth and smile.

Method

This concept was derived from the author's consistent over-preparation of teeth while attempting to achieve a desirable aesthetic outcome. Initial intention of 'veneering' the teeth often gave way to aggressive tooth preparation. Finally, ethical concerns of over-preparation prompted the author to rethink the process and question traditional methods of Smile Design techniques practiced at the time. If the teeth could be repositioned, orthodontically, to a pre-determined position, with nominal retroclining (lingually tipped), and finally factor in a miniscule amount of space amid the teeth to be restored, would it contradict sanctioned beliefs known as 'truths' in modern dentistry today?(Figure 2). Would it defy the biomechanics of function and occlusion, mechanics of torque and tipping, or infringement of the perceived confines of the true envelope of function? The Answer is no, it doesn't affect these elements providing certain factors are considered and respected when planning the case.

The use of Invisalign technology, specifically the 'ClinCheck' can be an indispensable device for pre-restorative orientation and congruity of the teeth

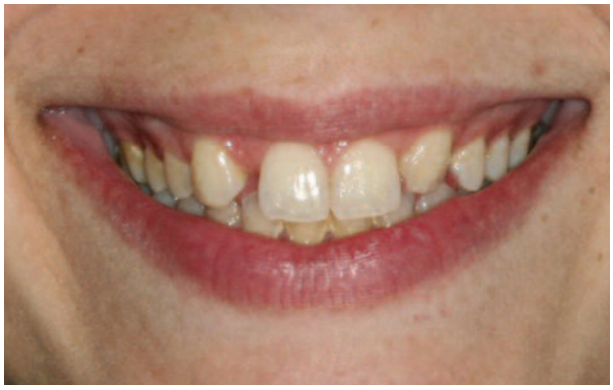

Figure 5: Pre-orthodontic position of teeth in patient 1:2 smile. Patient was told only option were three unit bridges in anterior and pontics would be abnormally small for the lateral tooth.

(Figures 3 - 5). The ClinCheck provides a virtual rendition of the teeth and their defined movement within the given arch. Within the Invisalign technology, various views can be viewed to simulated a three dimensional view of the arch(es) and the teeth within them and aid in understanding the path of the teeth. This virtual mechanism can be manipulated to achieve the desired position of the teeth, thus positioning the teeth in such a way as to minimize the invasiveness of the preparation sequence later in treatment (Figures 6 - 8). A three degree 'tipping' (retroclining) of the anticipated teeth to be restored using expansion initially, to maximize the use of the arch form, followed by retroclining the desired number of teeth. This will allow enough facial space/reduction and volume for restorative porcelain (Figure 9). It is important to note that only the teeth desired for restorative porcelain need to be retroclined the three degrees to allow for porcelain overlay, all other teeth need not be retroclined other than to achieve ideal position. The subsequent retroclining of the teeth will enable

Figure 6: Post-orthodontic position of teeth using Align's ClinCheck. Teeth are now positioned for restorative ten veneers. Notice bilaterally missing lateral incisers. Canines moved to Lateral position.

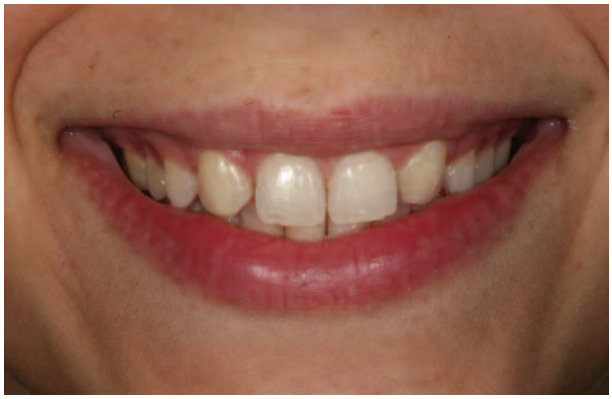

Figure 7: Post-orthodontic position of teeth in close-up smile, pre-restorative position.

approximately .3mm - .4mm of facial thickness of porcelain. An incisal bevel will most likely remain necessary unless lengthening of the teeth is appropriate for the given restorative case. Retroclining of the teeth will cause a virtual .3mm reduction in the tooth do to the tipping effect.

If a ceramist traditionally uses a 'cutback' technique when building the incisal characteristics, they will require approximately a 1.5mm reduction incisally when exercising this approach. It is essential to remember that .3mm is already factored in based on retroclining (relative intrusion) the teeth but an additional 1.2mm will be needed in either incisally lengthen the teeth, incisally reduce, or perhaps, both.

When considering the preparation phase of a smile enhancement often breaking of contacts must be considered. In the past, conservative dentistry has included the notion of not breaking contacts between the teeth to maintain the integrity of the teeth. The primary objectives for breaking contacts are:

- Open contacts will ensure a clean draw when taking an impression and reduce chance of tearing.
- The Provisional phase will tend to 'lock on' more effectively with open contacts and provide strength for the several weeks it will be in place.
- When a laboratory separates 'tooth dies' that are in contact to one another the separation of the dies can actually affect, or degrade the integrity of the margins upon segregation of the 'dies' upon a model from shear thickness of the blade.

During the Invisalign phase, a .10mm-induced diastema is requested between each tooth being restored but not distal to most posterior teeth to maintain tooth-to-tooth contact. In other words, if ten teeth are to be restored in the maxillary arch then .8mm spread (total reduction with .10mm between all 8/10 teeth) between all teeth involved will create an open contact between the selected teeth except distal to #4 and #13.

Figure 8: Post-orthodontic position of teeth in close-up Face, pre-restorative position.

The initial movement of maxillary / mandibular teeth, the three degree retroclined position of the teeth, as well as the precision placement of the .10mm diastemas are all performed at the same time in the initial Invisalign phase (Figures 10 and 11). Therefore, even though the teeth in the maxillary and mandibular arches are moving to a more ideal position the restored teeth will be moving simultaneously to the 3-degree retroclined position and maintain a .10mm diastema.

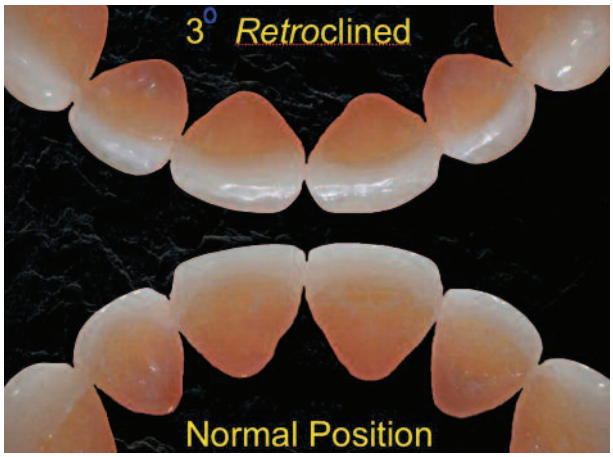

Figure 9: Comparison of normally positioned teeth and 3-degree retroclined position.

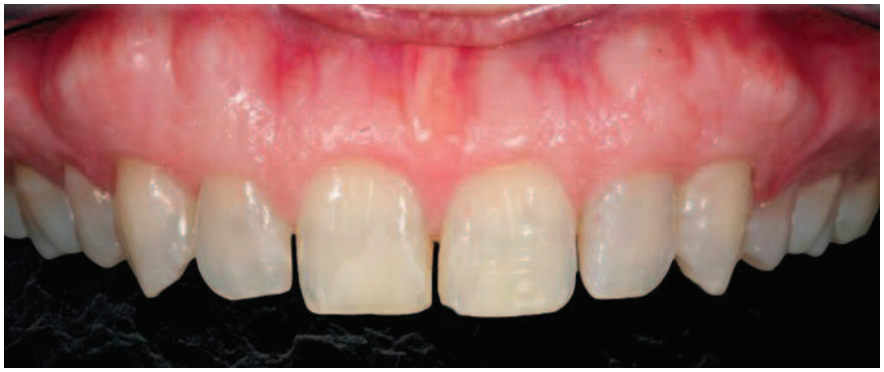

Figure 10: Teeth pre-Invisalign.

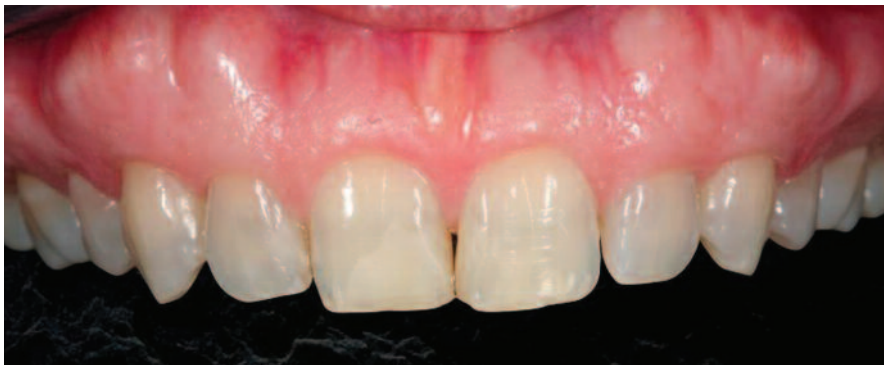

Figure 11: Teeth Post-Invisalign and after .10 mm diastemas placed for restorative veneers.

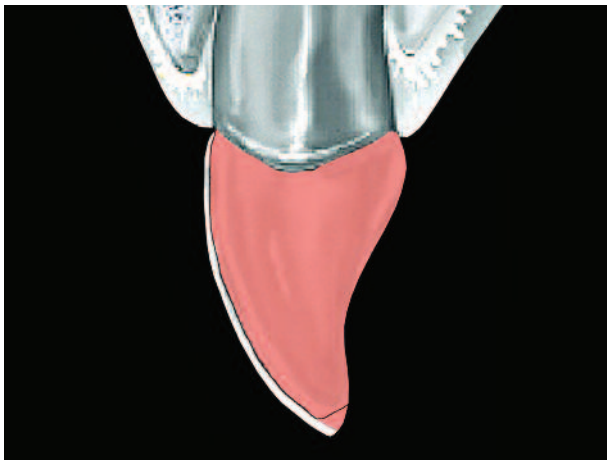

Figure 12: Tooth after Invisalign Movement. Conservative preparation of teeth.

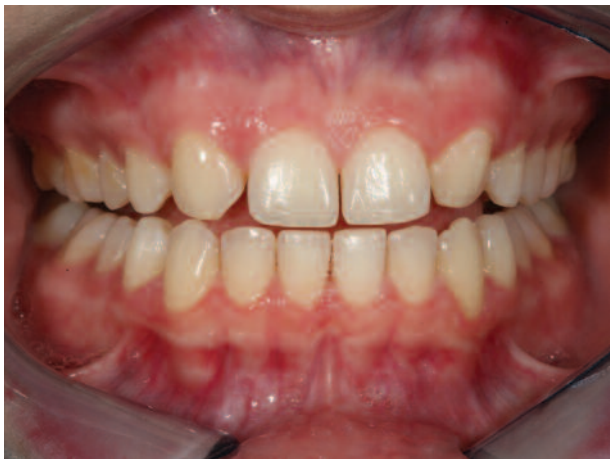

Figure 13: Invisalign phase I has led to conservative preparation of teeth for restorative veneers.

Once the initial Invisalign phase is complete, retention using the final aligner will be utilized for four weeks, records for Smile Design after that time, and then commencing with the restorative phase of treatment. The provisional teeth after preparation will also act to ensure retention with a retention appliance placed following final placement of restorations. This appliance will be canine guided and worn at night.

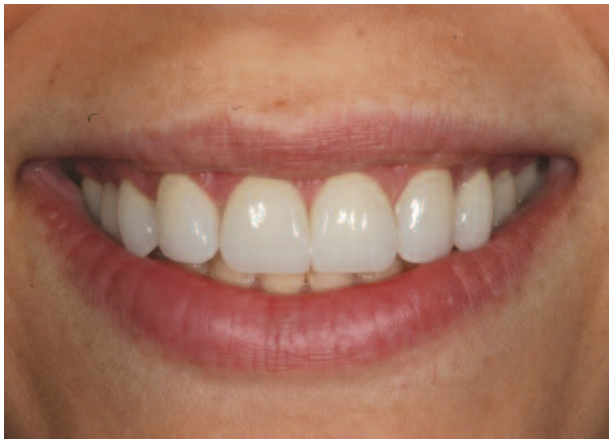

Figure 14: Post Restorative. Three days post-placement.

Due to the fact that the Invisalign phase has positioned the teeth to a near-ideal position, using the 3-degree retroclined position of the teeth and the .10mm diastemas placed between teeth will set the restorative element up for success. Non-invasive preparation of the teeth should be relatively straightforward and minimal in nature (Figures 12 and 13). As mentioned, the provisional phase will act as the new retentive appliance before the final restorations are placed.

The synergistic effect of Invisalign technology and non-invasive restorative techniques can truly be the Powerhouse of Aesthetic success (Figures 14 -16) if the progressive dental professional chooses to embrace what contemporary technology has to offer.[5] Conservative dentistry is available to the avant-garde clinician that wishes to excel to a new level of aesthetic excellence.

References

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Dr Trent Smallwood is a keynote speaker at Dentistry Live, London, 25-26 May 2012

Figure 15: Post Restorative smile. Patient happy with outcome and has sound and harmonious occlusion

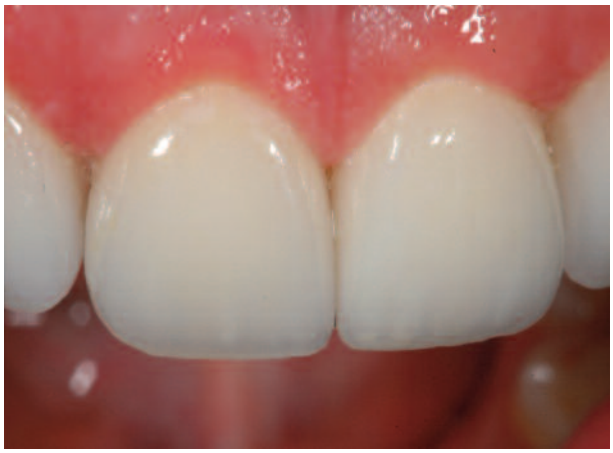

Figure 16: High end aesthetic result using Empress (Dentistry crafted by Gold Dust Laboratory)