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Case Report

Pre-orthodontic Provisionalization (POP): A 3-D Blueprint for Communication

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One of the most common interdisciplinary cases that presents to the dentist's/orthodontist's office is a patient who has experienced wear of their dentition. Historically, dentists have referred these patients to orthodontists requesting intrusion of the worn teeth so that vertical space for restorations can be created. In this traditional method, pure intrusion forces are required, and a guessing game exists regarding the precise amount intrusion of the maxillary and mandibular teeth that is ideal for that patient. This creates a nebulous orthodontic goal, and neither the orthodontist nor the dentist is confident that the ideal amount of intrusion has been accomplished in each arch. Furthermore, if wear is present on the anterior dentition, then the patient must experience an anterior open bite as teeth are intruded, resulting in compromised esthetics, chewing, and enunciation.

Case 1 below demonstrates this traditional method of intruding worn anterior teeth in preparation for definitive restorations.

Fig 1 series a: Pre-treatment photos of patient with anterior worn dentition

Fig 1 series b: Treatment photos of patient nearing end of orthodontic treatment. Note absence of accurate incisal edge anatomy, making assessment of ideal incisal display difficult. Furthermore, incisal edge function is absent, making mastication and enunciation challenging.

Fig 1 series c: Post-orthodontic, pre-restorative photos. Orthodontic treatment was 18 months in duration. Note the lack of accurate incisal edge anatomy, making assessment of incisal display and smile arc challenging.

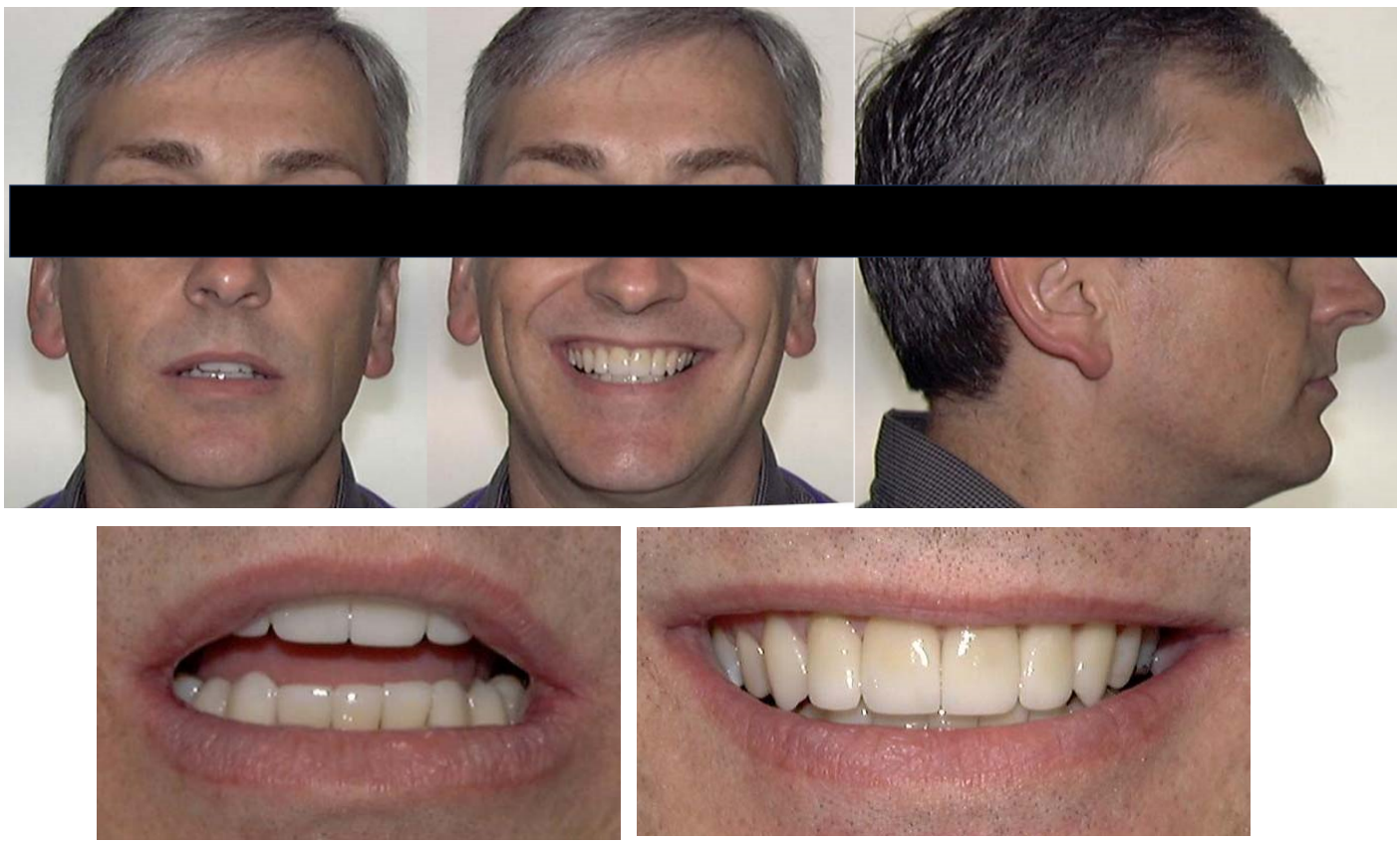

Fig 1 series d: Post-restorative photos demonstrating improved incisal anatomy and enhanced incisal display in repose and in smiling.

A more efficient method for creating restorative space occurs when the restorative dentist performs pre-orthodontic provisionalization (POP) of all worn teeth. This establishes proper anatomy of the dentition and allows the orthodontist to utilize a combination of extrusive and intrusive forces to more efficiently achieve alignment. Furthermore, POP provides a 3-D blueprint for communication between the restorative dentist and the orthodontist, removing the guesswork and the possibility of miscommunication between the two doctors.

Case 2 below demonstrates a more modern and efficient method of creating restorative space utilizing the concept of POP.

Fig 2 series a: 62 y.o. patient presents to her restorative dentist with a chief complaint of short, worn, unattractive teeth. She has a Class I deep bite malocclusion and thinning of anterior enamel.

Fig 2 series b: Cephalometric radiograph reveals a low mandibular plane angle and orthognathic jaw relationships. Panoramic radiograph reveals multiple dental restorations and missing third molars.

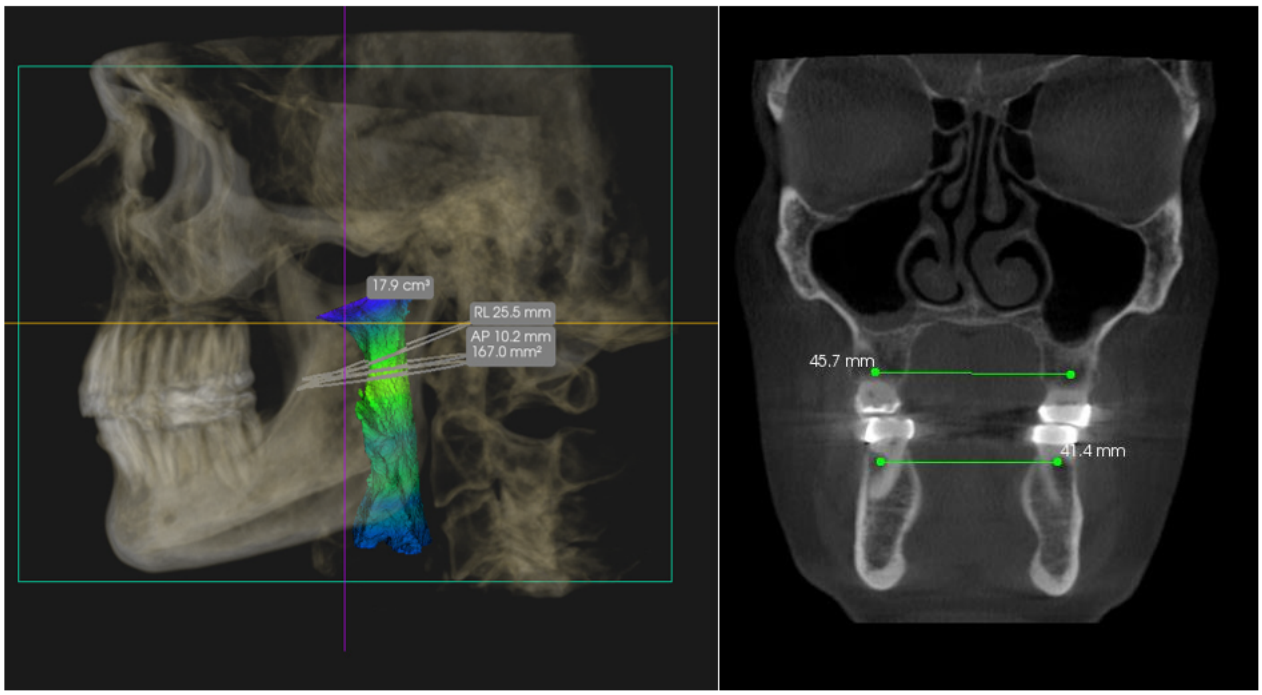

Fig 2 series c: CBCT shows a minimal axial airway of 167 mm2 and well-coordinated maxillary and mandibular transverse widths.

Fig 2 series d: According to the Global Diagnosis** process, the patient demonstrates a slightly long lower facial height, long upper lip (normal values are 20-22mm in females) and a slightly hyperactive upper lip (normal values are 6-8mm).

Fig 2 series e: The patient's anterior gingival architecture is not level. Her maxillary incisor is short (ideal is 10-11mm), and the CEJ cannot be felt beneath the gingival margin with an explorer, indicating the presence of Altered Passive Eruption.

Fig 2 f: Summary of the Global Diagnosis** process.

Fig 2 series g: Pre-orthodontic provisionalization of all worn teeth and Esthetic Crown Lengthening (ECL) was performed by her restorative dentist.

Fig 2 series h: Immediately following ECL and POP, Norris 20/26 orthodontic brackets* were placed, maxillary anterior bite turbos, and .014” Norris Extra-Broad NiTi wires* were delivered. Note the presence of anterior bite turbos on the lingual surfaces of the maxillary incisors. The bite turbos help to establish a new vertical dimension of occlusion (VDO) and help to protect the POP from masticatory trauma.

Fig 2 series i: Patient was instructed to use 5/16” 2 oz. trapezoidal elastics* throughout treatment to facilitate eruption and interdigitation of posterior occlusion. By employing POP, intrusive and extrusive orthodontic movements are utilized, thus making orthodontic movements more efficient and effective.

Fig 2 series j: At the second appointment, second molar buccal tubes were placed, .018” x .018” Norris Extra Broad NiTi wires* were placed in both arches, and posterior vertical elastics were continued.

Fig 2 series k: At the third appointment, an .019x.025” Norris Extra Broad NiTi wires* were placed, and night-time vertical elastics were continued.

Fig 2 series l: A leveling bend was placed between the central incisors to compensate for the differences in gingival margins between the central incisors. Following leveling of the gingival margins, composite resin was added to the maxillary right central incisor, lateral incisor, and canine to provide symmetry. Refinement of provisional restorations during orthodontic treatment is called “dynamic bonding” and is important in visualization of the final restorations.

Fig 2 series m: Post-orthodontic, pre-restorative photographs of the patient’s dentition. Orthodontic treatment was nine months in duration. Note that detailed interdigitation of posterior teeth is not required due to plans for a comprehensive restorative rehabilitation.

Fig 2 series n: Final orthodontic records of patient after final restorations.

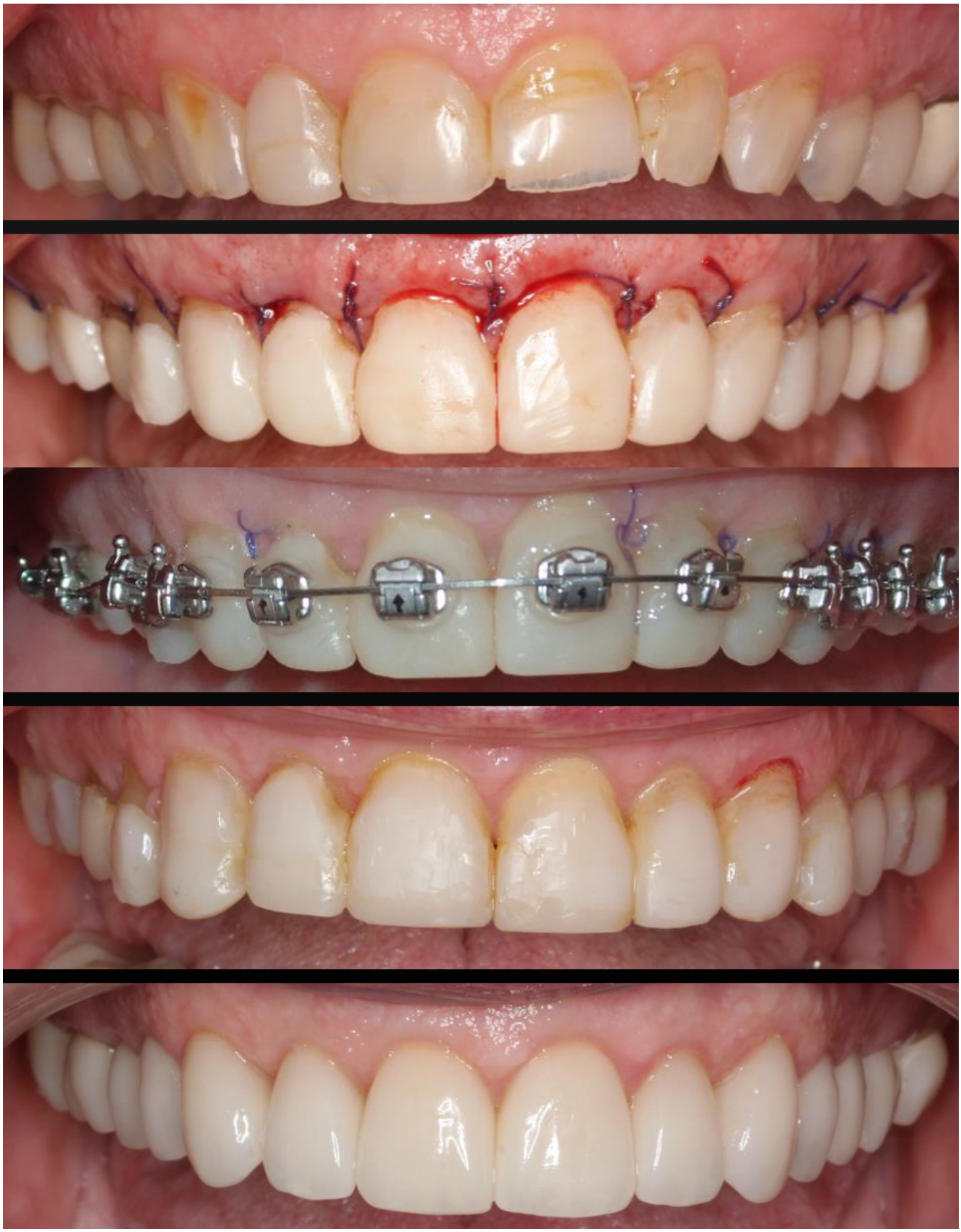

Fig 2 series o: Progressive images of maxillary anterior dentition throughout treatment. 1) Original. 2) After ECL and POP. 3) During orthodontic treatment. 4) After orthodontic treatment. 5) After final restorations.

In summary, pre-orthodontic provisionalization (POP) is an efficient and effective method to restore the natural anatomy of worn teeth prior to the placement of orthodontic appliances. POP allows the restorative dentist to dictate the size and shape of the final restorations and affords the orthodontist accurate incisal edges so that bracket placement can be more accurately performed. Furthermore, accurate incisal edges during orthodontic treatment allows efficient assessment of incisal edge display in repose and smiling throughout orthodontic treatment. POP also allows patients to enjoy enhanced esthetics, anterior mastication, and improved enunciation during orthodontic treatment. By allowing the orthodontist to employ a combination of extrusive and intrusive forces, POP provides an environment in which orthodontic treatment can be treated more efficiently with less time and fewer appointments.

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