It can be concluded that excellent treatment results can be achieved with "old school" conventional torquing appliances in the anterior maxilla when tooth anatomy and the characteristics of the orthodontic appliance are sufficiently considered during torque application.

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Authors' response

Thank you for your comments on our recent article. We agree with your opinion on the value of traditional biomechanics for the management of torque. The purpose of the case report was to provide clinicians with a simple, yet effective alternative, rather than replacing or lowering the usefulness of traditional torquing techniques, because managing torque control in a patient requires opposite torques on the adjacent teeth using special treatment biomechanics.

The conventional torque controls, including torque bend on stainless steel wire, and the use of Warren springs and inverted brackets, were not really satisfactory in that case. The radiographs showed that the maxillary right central incisor root was clashing with the mesially inclined root of the maxillary right lateral incisor. Treatment using an upper removable appliance,

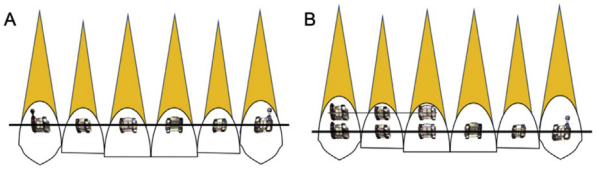

Fig 1. A, All maxillary anterior brackets are positioned gingivally. **B,** A twin-brackets–twin-wires system is used for torque control; brackets on other teeth are positioned at normal height.

and the use of a contralateral bracket on the lateral incisor at the beginning of the treatment using fixed appliances, resulted in a mesially inclined root of the maxillary right lateral incisor. After correcting the overlapping root, a simple approach—"twin-brackets–twin-wires" (ie, a second row of brackets bonded cervically on the teeth with an NiTi wire fully engaged)—was used to achieve the opposite torque control on the central incisor and lateral incisor. The correction of root torque was effective and efficient.

In comparison with traditional biomechanics, this twin-brackets–twin-wires approach has some advantages. Because of the differences in the anatomical shape and crown inclination of the maxillary right central incisor and lateral incisor, the gingivally bonded auxiliary twin-brackets–twin-wires, together with the main fixed appliances, can generate a moment for torque correction. Although placing maxillary incisor brackets gingivally has been already discussed by Pitts,[1] bonding a second row of brackets with a sectional archwire for torque management was first introduced in the case report (Fig 1); also, changing the heights of brackets may cause undesired root torque.[2,3]

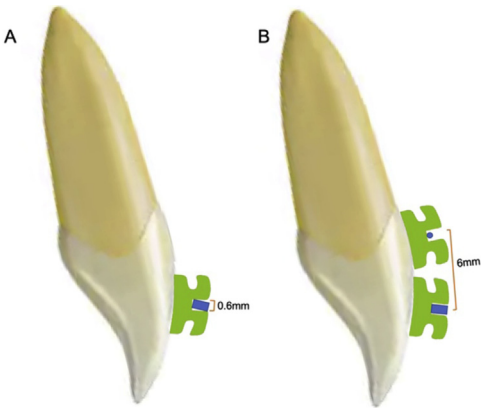

Fig 2. A, The bracket slot is about 0.6 mm in depth. **B,** The twin-brackets–twin-wires approach could lengthen the force arm to about 6 mm.

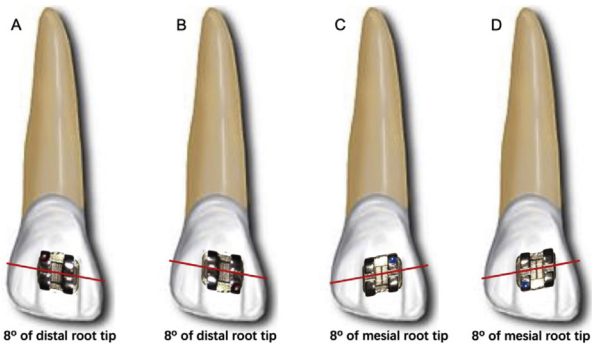

Fig 3. A, Ipsilateral upright bracket. **B,** Ipsilateral inverted bracket. **C,** Contralateral upright bracket. **D,** Contralateral inverted bracket (3M system, maxillary lateral incisor).

We agree that the inverted bracket can be used to change the torque value from positive to negative or vice versa. For example, an inverted Roth lateral incisor bracket can change the palatal root torque from 8° to −8°, thus delivering an increased inclination of 16°. By inverting the torque bracket, the prescription torque can be expressed effectively using a full-size wire, eg, 0.021 × 0.025″ wires in 0.022 × 0.028″ slots. Because the bracket slot is about 0.6 mm in depth (Fig 2, *A*), this approach may produce high forces in the bracket slots and generate reciprocal torque, especially for preadjusted brackets, causing unnecessary back and forth torque action to the adjacent teeth as you mentioned.[4,5] In the twin-brackets–twin-wires approach, the auxiliary sectional NiTi wire could lengthen the force arm to about 6 mm (Fig 2, *B*), producing a relatively light soft force for torque control, minimizing unnecessary torque action on adjacent teeth.

It is recommended that reversed brackets bonded for torque control must be on the same side of the arch for maintenance of the mesio-distal root tip.[5] In the presented case, an inverted contralateral bracket was bonded on the right lateral incisor for management of the initial root distal inclination (Fig 3). The use of a contralateral bracket to correct tooth inclination has been reported in the literature.[6] During the treatment, however, the right lateral incisor root tipped further mesially, leading to overlap of the root apex of the maxillary central incisor and the lateral incisor (Fig 4). Therefore, we recommend taking regular periapical radiographs to monitor the progress of angulation correction and replacing the contralateral bracket with a correct bracket once the angulation is fully corrected.

It has been found that it is not efficient for single tooth correction if many torquing auxiliaries are used on several teeth.[7,8] Warren springs can be used on a round or undersized wire[9] for torque control of the maxillary central and lateral incisors independently.[6,10] In our case, opposite torques were required on adjacent teeth, that is, the lateral incisor required a root labial torque and the central incisor and canine required root palatal torques. The twin-brackets–twin-wires approach was simple yet effective to generate the opposite torques required, and the activation ceased spontaneously when the crowns were aligned, which avoids unnecessary overcorrection and a related round-tripping movement (Fig 5).

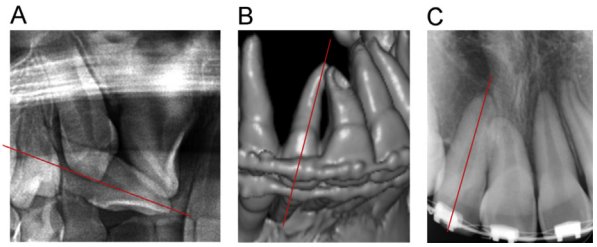

Fig 4. A, Pretreatment radiograph showing the maxillary right lateral incisor was mesially tipped. **B,** CBCT showed overlap of the root apex of the maxillary right central and lateral incisors. **C,** The root separation of the maxillary right central and lateral incisors.

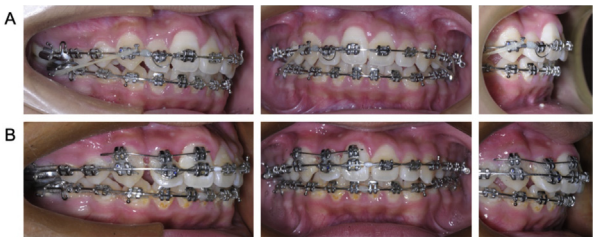

Fig 5. A, Warren spring. **B,** The twin-brackets–twin-wires approach.

The twin-brackets–twin-wires approach used in our case was based on old-school conventional torquing mechanics but provides an alternative method for management of torque, especially in patients who require opposite torque on adjacent teeth.

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Cervical spine posture and Twin-block treatment

I read with great interest the excellent article entitled, Evaluation of cervical spine posture after functional therapy with twin-block appliances: A retrospective cohort study (Kamal AT, Fida M. Am J Orthod Dentofacial Orthop 2019;155:656-61). These authors found that craniocervical posture became more upright after Twin-block therapy. Craniocervical posture was also found to be related to the size of the mandible, which in turn has been related to airway size.[1]

Timms[2] postulated that a reduction in oropharyngeal airway after mandibular setback surgery might be compensated for by cervical hyperflexion, and this was later confirmed by several studies.[2-6]

It is well established that Class II patients have a reduced oropharyngeal airway compared with Class III patients, with Class I being intermediate.[7] Craniocervical angle was found to be on average 10° larger in patients with obstructive sleep apnea,[8] who incidentally also have reduced oropharyngeal airway dimensions.

Treatment with the Twin-block appliance has been shown to increase the width of the oropharyngeal airway,[1,9,10] which may well account for the change in craniocervical posture. Thus, once an adequate airway has been established, it is no longer necessary for the patient to compensate for an inadequate airway by cervical hyperflexion, and they revert to their normal posture.

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Authors' response

Thank you for your keen interest in our article (Kamal AT, Fida M. Evaluation of cervical spine posture after functional therapy with twin-block appliances: A retrospective cohort study. Am J Orthod Dentofacial Orthop 2019;155:656-61).

One of the characteristic skeletodental findings that has been well established in Class II patients is that they lack an upright cervical posture.[1-3] Research in the field of orthopedics has revealed various vertebral anomalies and postural abnormalities associated with