



## A UNIVERSAL TORQUE WRENCH SYSTEM

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Dental implant manufacturers supply various forms of torque limiting devices for use with implant restorations. A clinician may use these instruments to ensure adequate torque delivery with appropriate precision.<sup>1-4</sup> Throughout the early period of dental implant prosthetics, screw loosening was a major complication,<sup>4,8</sup> but a later study found that while screw loosening remained a potential prosthetic complication, it was less common than the early studies suggested.<sup>9</sup> Nevertheless, inadequate tightening with insufficient torque has been cited as a possible reason for screw loosening.<sup>10</sup>

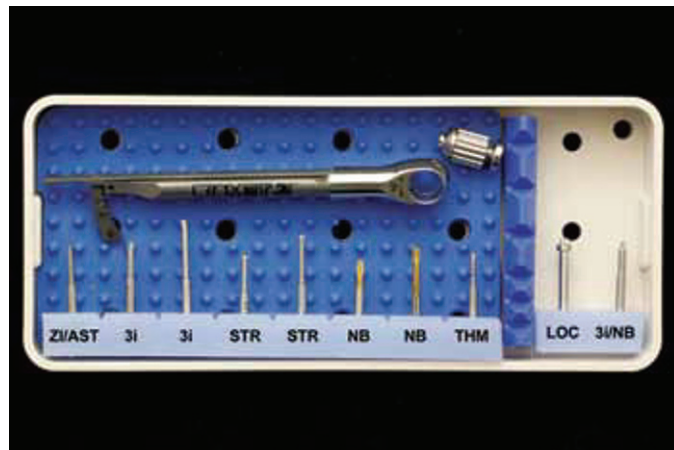
Two major categories of torque limiting devices for use in implant dentistry are available: friction-style and spring-style. Friction-style devices are hexagon wrenches with a handle that releases when a desired torque value is reached. Spring-style devices have torque levels on an incremental scale, and the operator applies a force on the spring until the appropriate torque level is reached. Spring-style devices have been reported to be significantly more accurate than friction-style devices.<sup>11</sup>

Spring-style torque limiting devices have been adapted to multiple implant systems,<sup>12</sup> which has simplified dental implant prosthetics. The technique, however, had limited torque control because of the lack of an incremental scale, allowing the op-

erator to deliver torque values other than the preset 0, 15, and 35 Ncm. Since 1999 when this technique was published,<sup>12</sup> substantial changes in implant systems have occurred and updates to the technique are indicated. The purpose of this article is to describe a universal implant torque kit that would allow an operator to provide precise torque values to implant components from various dental implant manufacturers.

### PROCEDURE

1. Determine the implant system present, the type of screw connection used, and the configuration of the screwdriver interface required. Remove the instrument cassette containing the torque limiting device (part # L-TIRWK; Biomet 3i, Palm Beach Gardens, Fla) (Fig. 1) from the sterilization pouch (part # 9792439; Henry Schein Inc, Melville, NY).



**1** Instrument kit with available inserts, from left to right: 0.050-in. hexagon straight (Zimmer part # HX1.25D), 0.048-in. 24 mmL hex (Biomet 3i part # RASH3N), 0.048-in. 30 mmL (Biomet 3i part # RASH8N), 6-point star 20 mmL (Straumann part # 046.410), 6-point star 26mmL (Straumann part # 046.411), unigrip star 20 mmL (NobelBiocare part # 29151), unigrip star 25 mmL (NobelBiocare part # 29152), 4-lobe star 22 mL (Thommen part # 3.03.501), locator (Biomet 3i part # LOADT4), 0.035-in. hexagon 24 mmL (Biomet 3i part # RASH2N). Legend: ZI = Zimmer Dental, AST = AstraTech, 3i = Biomet 3i, STR = Straumann, NB = Nobel-Biocare, THM = Thommen, LOC = Locator.

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**TABLE I.** Common screw inserts and torque values for various dental implant manufacturers. (AstraTech, Ankylos, XiVe, Dentsply Friadent Implants, Waltham, Mass; Biomet 3i, Palm Beach Gardens, Fla; Camlog, Carlsbad, Calif; ImplaMed, Sterngold Dental, Attleboro, Mass; Imtec-3M MDI, St Paul, Minn; Keystone Dental, Burlington, Mass; Mega'Gen USA, Englewood Cliffs, NJ; NobelBiocare, Yorba Linda, Calif; Straumann USA, Andover, Mass; Thommen Medical USA, Cleveland, Ohio; Zimmer Dental, Carlsbad, Calif)

Implant System	Drivers					Torque Values						
	.035" Hex	.048" Hex	.050" Hex	Star (Unigrip)	Star (6-points)	4-lobe	10 Ncm	15 Ncm	20 Ncm	25 Ncm	30/32 Ncm	35 Ncm
AstraTech			✓					✓	✓	✓		
Biomet 3i	✓	✓					✓		✓		✓	✓
BioHorizons	✓		✓								✓	
Camlog			✓					✓	✓	✓	✓	
Friadent	✓	✓	✓				✓	✓				
ImplaMed		✓							✓		✓	
Implant Direct			✓								✓	
Imtec			✓						✓			
Keystone Dental	✓	✓					✓		✓		✓	
Mega'Gen		✓										✓
NobelBiocare	✓			✓				✓				✓
Straumann					✓			✓				✓
Thommen						✓		✓		✓		
Zimmer Dental			✓						✓		✓	



**2** Place handle/insert combination into access hole of restoration. Figure shows unigrip star insert with driver tip handle.



**3** Apply torque by placing 1 finger on handle insert and other finger on spring handle until desired value is reached. Figure shows 15 Ncm torque applied for Nobel multiunit abutment.

2. Select a driver insert (Table I) that is compatible with the screw-driver interface. Remove the insert from the modified bur block (BurButler 60; Gate Dental Services Ltd, Galway, Ireland) and place the insert into the interchangeable driver tip handle (part # MIDTH; Biomet 3i) until firm resistance and a click is felt.

3. Insert the handle/insert combination into the access hole of the restoration (Fig. 2). Manipulate until the insert engages the screwdriver interface and hand-tighten until light resistance is met.

4. Place the torque limiting device over the handle/insert combination until a click is felt. Place 1 finger over

the handle/insert combination and another finger over the finger projection of the device and depress until the desired torque value is reached (Fig. 3).

5. Remove the device and restore the screw access hole.

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## NOTEWORTHY ABSTRACTS OF THE CURRENT LITERATURE

## Clinical and radiographic evaluation of patients receiving both tooth- and implant-supported prosthodontic treatment after 5 years of function

Wolleb K, Sailer I, Thoma A, Menghini G, Hammerle CH.  
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**Purpose.** The aim of this research was to assess survival and complication rates of tooth- and implant-supported fixed dental prostheses (FDPs) and single crowns (SCs) after 5 years of function in a specific patient population group who underwent comprehensive prosthetic treatment. Materials and

**Methods.** This retrospective study included a convenience sample of 52 patients who met specific inclusion and exclusion criteria and were treated during two specific courses as part of the undergraduate curriculum. The patients' prosthodontic treatment comprised 296 tooth-supported and 37 implant-supported SCs together with 76 tooth-supported and 15 implant-supported FDPs. Pre- and posttreatment clinical examinations included screening for biologic and technical complications, probing pocket depth, bleeding on probing (BoP), and plaque control record (PCR) as well as intraoral radiographs. Information was obtained from the patients about dental hygiene and dental visits, treated complications, and patient satisfaction during the observation period. Descriptive statistics were employed.

**Results.** Forty-five patients were followed for a mean observation period of  $5.26 \pm 0.47$  years. The survival rates were 99.0% for tooth-supported SCs, 98.7% for tooth-supported FDPs, and 100% for implant-supported FDPs and SCs. Loss of vitality was observed in 2.9% of all abutment teeth deemed to be vital initially. Endodontic complications occurred in 5% and root fracture in 2.5% of nonvital abutment teeth. Caries was found in 0.4% of abutments. No framework or implant fractures were observed, but fracture of the veneering ceramic affected 3.8% of FDPs. The mean BoP was  $21.5\% \pm 9.9\%$ , and the mean PCR was  $22.8\% \pm 16.5\%$ . A high satisfaction rating was provided by 82.2% of patients.

**Conclusion.** High survival and relatively few complication rates were observed for all prescribed FDPs over the observation period.

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