Reply to letter to editor: Patient-specific instruments in total knee arthroplasty

Daniele Mazza • Fabio Conteduca • Raffaele Iorio •
Andrea Ferretti

Received: 18 March 2014 / Accepted: 18 March 2014 / Published online: 11 April 2014
© Springer-Verlag Berlin Heidelberg 2014

The authors thank you for sharing your thoughts and questions on our study entitled “Patient-specific instruments in total knee arthroplasty”.

In your letter [1] you are convinced that patient-specific instruments (PSI) may offer advantages in total knee arthroplasty (TKA) such as decreased operative time, bleeding and faster recovery. Hamilton et al. [2] found that total surgical time was over 4 minutes shorter for patients in the PSI group (57.4 minutes vs. 61.8 minutes). Stronach et al. [3] found a mean surgical time of 59.1 minutes for TKA performed with the standard technique and 59.2 minutes with PSI. Chareancholvanich et al. [4] reported shorter operative times with PSI and concluded the 5.1 minutes saved were not clinically relevant. Nunley et al. [5] found that TKA performed with PSI and traditional instrumentation had similar tourniquet times (61.0 versus 56.2 minutes), similar time in operating room (125.1 versus 137.2) and similar incision to closure time (89.6 versus 93.4).

However, in your letter you noted our typing error. In our study [6] we stated that in the coronal plane the mean deviation of the extra-medullary (EM) tibial guides from the ideal alignment (0°) was $0.7^\circ \pm 0.39$ and of the VISIONAIRE was $129^\circ \pm 1.55$ ($P=0.22$). As previously published [7], the deviation of VISIONAIRE was 1.29° , not 129° .

In your letter you suggest that CT-based custom jigs were able to reproduce the posterior slope. We are in agreement with you, that the problem of not being able to reproduce an ideal alignment in the sagittal plane of the tibia may be inherent to the MRI-based jig of Visionaire. In fact, only a MRI imaging with a lateral

view extending 8 cm below the joint line is acquired pre-operatively.

However, Koch et al. [8] radiographically analysed CT-based custom jigs. They found that for the tibial slope, out of 301 cases, a total of 37 cases (12.3 %) of outliers $>3^\circ$ were found. There are limitations in this study including some lack of precision while measuring axes and component position on conventional X-rays and the lack of a control group either conventional or computer-assisted surgery (CAS) TKA.

We believe that the current PSI seem is not able to result in the same degree of accuracy as the CAS system, while comparing well with standard manual techniques with respect to component positioning and overall lower axis, in particular in the sagittal plane.

Therefore, even if PSI appears as a promising technology, the accuracy could still be improved, possibly leading to greater reliability.

References

1. Vaishya R, Vijay V. Letter to the editor—“Patient-specific instruments in total knee arthroplasty”. *Int Orthop*. doi:10.1007/s00264-014-2335-9
2. Hamilton WG, Parks NL, Saxena A (2013) Patient-specific instrumentation does not shorten surgical time: a prospective, randomized trial. *J Arthroplasty* 28(8 Suppl):96–100
3. Stronach BM, Pelt CE, Erickson J, Peters CL (2013) Patient-specific total knee arthroplasty required frequent surgeon-directed changes. *Clin Orthop Relat Res* 471(1):169–74
4. Chareancholvanich K, Narkbunnam R, Pornrattanamaneewong C (2013) A prospective randomised controlled study of patient-specific cutting guides compared with conventional instrumentation in total knee replacement. *Bone Joint J* 95-B(3):354–9
5. Nunley RM, Ellison BS, Ruh EL, Williams BM, Foreman K, Ford AD, Barrack RL (2012) Are patient-specific cutting blocks cost-effective for total knee arthroplasty? *Clin Orthop Relat Res* 470(3): 889–94
6. Conteduca F, Iorio R, Mazza D, Ferretti A (2014) Patient-specific instruments in total knee arthroplasty. *Int Orthop* 38(2):259–65

D. Mazza (✉) • F. Conteduca • R. Iorio • A. Ferretti
Orthopaedic Unit and “Kirk Kilgour” Sports Injury Centre, S.
Andrea Hospital, University of Rome “Sapienza”, Via Grottarossa
1035, Rome, Italy
e-mail: daniele.mazza@hotmail.it

7. Conteduca F, Iorio R, Mazza D, Caperna L, Bolle G, Argento G, Ferretti A (2012) Are MRI-based, patient matched cutting jigs as accurate as the tibial guides? *Int Orthop* 36(8):1589–93
8. Koch PP, Müller D, Pisan M, Fucentese SF (2013) Radiographic accuracy in TKA with a CT-based patient-specific cutting block technique. *Knee Surg Sports Traumatol Arthrosc* 21(10):2200–5