afterward from an anatomical imaging standpoint in our patient population.

We agree that our patient population may not be fully representative of the average direct anterior THA practice; however, we still feel that our findings would be applicable to other patients. Namely, the released tissues healed in continuity and did not retract additionally on further follow-up. We agree that there do not appear to be any functional differences whether the tendons are released or not. Furthermore, we believe that one of our primary outcome measures, the integrity of the anterior capsule in patients with capsulectomy versus repair, would not be affected even with a different patient population. Studies to examine the releases required in a more diverse patient population would indeed be revealing.

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Letter to the Editor on "The Direct Anterior Approach for Total Hip Arthroplasty for Severe Dysplasia (Crowe III and IV) Provides Satisfactory Medium to Long-Term Outcomes"

To the Editor:

We appreciate the article by Viamont-Guerra et al. [1] titled "The Direct Anterior Approach for Total Hip Arthroplasty for Severe Dysplasia (Crowe III and IV) Provides Satisfactory Medium to Long-Term Outcomes", January 2020 issue, regarding a retrospective evaluation of 29 consecutive total hip arthroplasties (THAs) performed by direct anterior approach (DAA) in 23 patients affected by coxarthrosis secondary to Crowe III-IV dysplasia and followed up to 20 years.

We truly congratulate the authors for their results in a pathological condition characterized by severe morphological abnormalities of both the hip bones and the surrounding soft tissues and using DAA to achieve the theoretical advantages of faster recovery, less pain, and a lower postoperative dislocation rate, although traditional (posterolateral and lateral) approaches are still used with great success [2–13].

Nevertheless some considerations should be drawn and some questions arise regarding the nine Crowe IV hips in which a subtrochanteric shortening osteotomy (SSO) was performed.

First, given the innovative procedure of DAA in THAs performed for developmental dysplasia of the hip sequelae, we would expect that surgical steps of femoral SSO were described with more details, even because in the two previous studies [14,15], THAs are respectively performed in supine position on a standard surgical table [14] and through a direct anterolateral approach performed in a supine position [15], whereas patients in the present cohort were operated on a traction table.

Second, more information should be provided about the 4 hips where cemented stems were inserted. Were all of them Crowe III hips or a cemented stem was used also in cases with a SSO? If the latter, this article would be the first, to our knowledge, to use a modern cemented implant in such a situation.

Third, we understand that "variance in implant types was due to the development in implant technology and hospital inventory" but it is unclear—as in case reported in Figure 1—what stems were mostly used among the uncemented ones; therefore, more information should be given, considering that several implants (conical/trapezoidal, monoblock/modular) are used worldwide [3–13] and that different outcomes have been reported using different types of stems [10].

Finally, given the fact that no dislocations were observed among postoperative complications and that placement of the acetabular cup in the true acetabulum when a severe dysplasia of the hip is present requires often shells with small outer diameters and consequently small diameters of the femoral heads, leading theoretically toward risk of instability, details of the coupling used in this large cohort with a follow-up of 2-20 years assessing THA performed by DAA for severe dysplasia would be overall appreciate.

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Reply to Letter to the Editor on "The Direct Anterior Approach for Total Hip Arthroplasty for Severe Dysplasia (Crowe III and IV) Provides Satisfactory Medium to Long-Term Outcomes"

In Reply:

We are grateful to Carrozzo et al [1] for their letter on our article titled "The Direct Anterior Approach for Total Hip Arthroplasty for Severe Dysplasia (Crowe III and IV) Provides Satisfactory Medium to Long-Term Outcomes." [2] They raise pertinent questions concerning the 9 Crowe IV hips included in our series and the specifics of the implants used. Many of the questions raised by the authors have been answered, with detailed illustrations, in our recent article [3] entitled "Surgical Technique and Case Series of Total Hip Arthroplasty with the Hueter Anterior Approach for Crowe Type-IV Dysplasia."

Carrozzo et al [1] first ask for a more detailed description of the steps of femoral subtrochanteric shortening osteotomies (SSOs) that were performed on Crowe IV cases in this series of patients using a traction table via the direct anterior approach. First, it was established whether an SSO was required by using an assembled trial stem with small head to test whether hip reduction was possible. If reduction was not possible despite progressive soft tissue release, the trial stem was removed and the hip was externally rotated without extension. Second, a 10-mm resection was performed on the diaphysis below the lesser trochanter. Third, to better visualize the canal, the distal fragment of the femur was tilted by positioning the leg downwards, allowing further broaching to compensate for the resected bone. Last, the final stem was inserted into the proximal fragment, then into the distal fragment as it was tilted back. If required, some rotation of the distal fragment could be applied to correct for excessive femoral neck anteversion; this could be planned if computed tomography scans were available preoperatively. In most cases, press-fit fixation provided sufficient stabilization for the osteotomy, but additional stability could be achieved using cerclage wires and/or plates with screws, if required.

For clarification regarding the second point raised by Carrozzo et al [1], 4 hips in this series received cemented stems (3 Crowe III and 1 Crowe IV), limited to the first few cases of the series in which femur size was small. Two of these had cup and stem revisions (1 Crowe III and 1 Crowe IV, at 18 and 14 years of follow-up, respectively) and the remaining 2 were bilateral implants in a single patient who died of causes unrelated to the THA after more than 13 years of follow-up. In none of these cases was an SSO required.

To address the third point raised by Carrozzo et al [1] we acknowledged that one of the limitations of our study was the variation in implant design during the course of a series collected over 23 years (1993-2016). The stems used throughout the original cohort were predominantly uncemented tapered stems, namely 12 AMIStem (Medacta), 8 Quadra (Medacta), 4 Metabloc (Zimmer - 2 cemented), 2 customized stems (Medacta), 1 MiniMax (Medacta), 1 Alize (FH - cemented), and 1 Lagrange-Letournel (Biomecanique - cemented).

Finally, Carrozzo et al [1] request more information regarding the size of coupling used. The outer diameters of the acetabular cups were 40 mm in 3 hips, 42 mm in 5 hips, 44 mm in 5 hips, 46 mm in 7 hips, 48 mm in 3 hips, 50 mm in 1 hip, and 54 mm in 1 hip (not recorded for 4 hips). Cups of diameter 44 mm or smaller received a 22-mm prosthetic head, while cups of diameter 46 mm or larger received a 28-mm or 32-mm head (36-mm heads were not used to avoid difficulties during hip reduction). We hope to have answered the remarks of Carrozzo et al [1] and take this opportunity to thank them again for engaging with our research.

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