Streamlining instrumentation

A streamlined and reproducible OR arrangement of the instrument and implant tables results in an easier to manage set up in the sterile field, creating open space in the OR. In contrast with regular set ups involving 8 to 13 trays, prof. dr. Kristoff Corten works with 2 trays to typically mount two tables for primary THA cases: a Mayo table with the standard instruments and a second table for the implant specific tools.[1] This may serve as an example for other orthopaedic setups.

Instrument table

For every case, the set of standard surgical tools is consistently arranged on a Mayo table. This table is strategically positioned at the foot end of the patient to support the first stages of the DAA THA procedure: capsular exposure and release.

The consistent arrangement of the instruments in exactly the same order ensures easy accessibility and overview for the surgeon, allowing the surgeon to himself pick up the instruments directly from the table with ease and efficiency.

Tray Table

Standardizing and reducing trays results in time efficiencies, cost savings, ergonomic benefits and workflow improvements.[2] Prof. dr. Kristoff Corten has reduced his trays down to two.

The Instrumentation Tray

After having reduced the regular trays by approximately 70%, only 2 trays remain, each below 8.5 kg (19 pounds) so that they comply with sterile tray weight regulations. Extra trays can be opened if necessary, though this is seldom required in standard primary total hip arthroplasty cases.

In order to minimize surgical trauma, five MedEnvision retractors are used, specifically designed with soft tissue-friendly curvature, reduced length, and a flat end for orthostatic retractor placement. Each retractor is numbered, promoting standardized usage. To further reduce soft tissue trauma and operating room time, the retractors are held in a stable, standardized position by the Gripper™ System.

A chain supports the calcar retractor during capsular exposure, and other essential instruments include a corkscrew driver with a T-handle, a straight stem impactor, and a straight reamer handle for the socket. The numbering of the MedEnvision retractors simplifies the work of the scrub during the procedure.

The Implant Instrumentation Tray

Standardizing component preparation and insertion is the first key factor to reduce the implant instrumentation tray. Pre-operative templating serves to anticipate potential challenges, like reaming for Dorr A type femurs or unusually large implants.

The instrumentation kit covers 98% of cases, with Pinnacle socket reamers available in sizes from 48mm to 58mm. The Corail stem broaches have been reduced from 11 to 9 sizes, discarding the two largest sizes.

A second key factor is reducing the variability between cases in terms of tray content. Prof. dr. Kristoff Corten uses the femoral dual offset broach handle—with slight curvature in the axial and transverse planes - in every case,

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irrespective of patient body type. Similarly, the offset acetabular reamer is always used, facilitating bikini incision surgery in obese patients. The implant instrument tray also includes a blunt, slightly curved rat tail canal finder, a straight impactor, and a calcar reamer.

Last, prof. dr. Kristoff Corten strives to recreate the anatomic centre of rotation during socket preparation, thus reducing variability during reaming.

The scrub nurse measures the femoral head diameter with a caliper, aiming to insert a Pinnacle socket—sized equal to or up to 2mm larger than the native femoral head. Components are prepared in the OR. Reaming begins with a straight reamer to remove hard subchondral sclerotic bone. Upon visualizing cancellous bleeding bone, the offset reamer is used. Since prof. dr. Corten underreams by 1mm relative to the final component diameter, only "odd diameter" graters from 43mm to 57mm are included in the tray, covering 97.5% of cases.

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1 For revisions, three tables are typically mounted to anticipate a higher degree of variability.

2 The literature on tray standardization and reduction is vast, among others: Toor, Jay, Ajay Shah, Aazad Abbas, Jin Tong Du, and Erin Kennedy. "Standardization of laparoscopic trays using an inventory optimization model to produce immediate cost savings and efficiency gains." PLoS ONE 17.12 (2022); Crosby, Lauren, Eric Lortie, Brian Rotenberg, and Leigh Sowerby. "Surgical Instrument Optimization to Reduce Instrument Processing and Operating Room Setup Time." Otolaryngology-Head and Neck Surgery 162.2 (2020): 215-219; Grodsky, Jacob D., Christos N. Theophanous, Sidney A. Schechet, Peter B. Veldman, and Seenu M. Hariprasad. "Reducing instruments in a vitrectomy surgical tray: cost savings and results from a major academic hospital." International Journal of Retina and Vitreous 6.1 (2020); Helmkamp, Joshua K., Elliot Le, Ian Hill, Rachel Hein, Suhail Mithani, Patrick Codd, and Marc Richard. "Addressing Surgical Instrument Oversupply: A Focused Literature Review and Case-Study in Orthopedic Hand Surgery." HAND 17.6 (2022): 1250-1256; Fu, Terence S., Haytham Msallak, Amirpouyan Namavarian, Albino Chiodo, William Elmasri, Brad Hubbard, Jason Xu, Rina Pegoraro, Kevin Higgins, Danny Enepekides, Eric Monteiro, and Antoine Eskander. "Surgical Tray Optimization: a Quality Improvement Initiative that Reduces Operating Room Costs." Journal of Medical Systems 45.8 (2021); dos Santos, Bruno Miranda, Flavio Sanson Fogliatto, Carolina Melecardi Zani, and Fernanda Araujo Pimentel Peres. "Approaches to the rationalization of surgical instrument trays: scoping review and research agenda." BMC Health Services Research 21.1 (2021).

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