

# Pushing the boundaries between registry data and the Dorr classification

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Dear Editor,  
The global trends in femoral stem fixation for primary total hip arthroplasty have shifted dramatically over the past decade. Joint registry data show marked geographic variation in femoral stem fixation practices in New Zealand, the United Kingdom and the United States of America (USA). These suggest that fixation is driven less by the proximal femoral morphology alone but more by age, bone quality and fracture risk. Hence, the Dorr classification of the morphology of the proximal femur needs a revisit.

Data from the American Joint Replacement Registry (AJRR) report that uncemented stems took the stage recently with 94–95% of primary total hip replacement (THA) procedures in the USA utilising uncemented stems, with restriction of use of cemented femoral (4–5%) stems in older patients—over 70—and fracture cases where these stems continue to show substantial survivorship reducing periprosthetic fracture and aseptic loosening risks.<sup>1</sup>

Comparatively, in the United Kingdom and New Zealand, while fully cemented fixation is declining significantly, uncemented use is increasing. The National Joint Registry (NJR) and the New Zealand Joint Registry (NZJR) correlate far more strongly with age and bone quality than with canal morphology. Osteoporosis and cortical thinning appear to be more perceived risks for periprosthetic fractures than canal flaring alone.<sup>2,3</sup> Table 1 summarises global registry trends in fixation.

New Zealand, in particular, clearly shows a statistically robust, age-dependent, structural change. Cemented stems will not vanish; they will continue to be a small, evidence-informed niche for the elderly, comprising approximately one in 20 primary THAs by 2035. And it looks like cemented stems will be a historical curiosity for the majority of surgeons and patients—an effectively and economically safe choice sidelined not because of evidence but rather a weak surgical

memory. Figure 1 gives us an idea about fixation trends in New Zealand comparing cemented vs uncemented fixation rates.

The original Dorr classification provides a useful radiographic heuristic in an era of first-generation cementless implants. However, recently taper-wedged and proximally porous-coated stems achieve reliable metaphyseal fixation even in femora considered type C in the Dorr classification.<sup>4,5</sup> This is attributed to their ability to distribute hoop stresses more predictably, and the reduction of subsidence risk compared with earlier designs. They understand bone quality indices better (e.g., cortical index, canal flare ratio). It is worth mentioning that registry survivorship curves do not demonstrate morphology-stratified failure patterns but rather age-stratified outcomes.

The Dorr classification itself has limited interobserver reliability and predictive value when isolated from other patient factors. Mazhar et al. reviewed 50 anterior–posterior radiographs of the hip. Two orthopaedic surgeons and two fellowship-trained arthroplasty surgeons reviewed these 6 weeks apart. Their Cohen kappa figures of 0.576 and 0.553, for both respectively, did not support the use of this classification.<sup>6</sup> Nakaya et al. found that when surgeons used assistive measures such as the cortical thickness index (a ratio between the femoral diaphyseal diameter and intramedullary canal diameter difference over the femoral diaphyseal diameter 10 centimetres distal to the mid-lesser trochanter), the reliability of the Dorr classification improved drastically only when indices were applied.<sup>7</sup> It looks like what might appear as a Dorr B to me may be a C to you. This subjectivity undermines the reliability of this classification as a decision-making tool. Furthermore, bone quality indices can and will change your perception of what Dorr type the canal is.

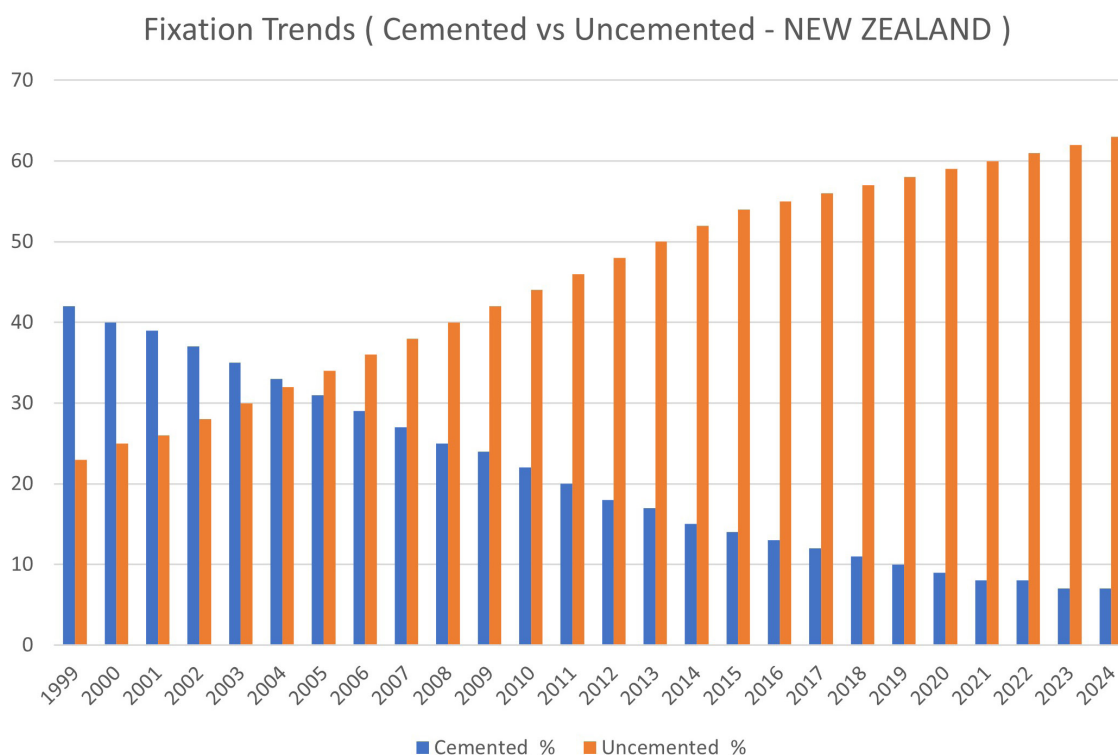
The central question arising now is does the Dorr classification still retain clinical relevance amid these evolving practice patterns? I say NO!

**Table 1:** Summary and analysis of trends across the AJRR, NJR and NZJR.

Registry	Cemented fixation	Uncemented fixation
AJRR (USA)	<b>Usage:</b> very low (<5%). <b>Key findings:</b> significant lower risk or revision for PPFx in patients >= 65 years (HR 0.189, p<0.0001) within the first 1.5 years. <b>Demographics:</b> elderly. <b>Projection:</b> will remain below 5% despite evidence of benefit “cement paradox”.	<b>Usage:</b> dominant (~95%). <b>Key findings:</b> higher early revision risk, but equivalent long-term survival to cemented once osseointegration happens. <b>Projection:</b> will remain default choice for most surgeons in the States.
NJR (UK)	<b>Usage:</b> declining but not significant decline: 14.4% in 2024. <b>Key findings:</b> benchmark for PPFx, lowest risk of revision. PPFx is a risk in uncemented hips predominantly. <b>10-year benchmark:</b> aggregate CPR 4.2%. <b>Projection:</b> will stabilise at 15%, used for elderly and according to fracture type.	<b>Usage:</b> up to 34.9% in 2024. <b>Key findings:</b> Highest early revision rates for PPFx. <b>10-year benchmark:</b> aggregate CPR 4.2%. Performs well in young patients. <b>Projection:</b> fracture risk holds it for the above-75s.
NZJR (NZ)	<b>Usage:</b> very low—even cemented acetabulum was only in 3% in 2024. <b>Key findings:</b> strongest in >= 65 years old. Revision rate 0.37/100 component-years. Significantly lower than uncemented (0.69) and hybrid (0.45). <b>Projection:</b> (<5%) reserved for elderly >=75 and osteoporotic patients.	<b>Usage:</b> dominant (51.7% in 2024 and growing). <b>Key findings:</b> highest risk in elderly >=75: 0.69/100 component-years. Performs well in <65 (0.67%). <b>Overall revision rate:</b> 0.64/100 component-years. <b>Projection:</b> continued growth, may increase early PPFx revision risk.

AJRR = American Joint Replacement Registry; NJR = National Joint Registry; NZJR = New Zealand Joint Registry; USA = United States of America; PPFx = periprosthetic fracture; HR = hazard ratio; UK = United Kingdom; CPR = cumulative percent revision; NZ = New Zealand.

**Figure 1:** Fixation trends (cemented vs uncemented)—New Zealand.



The Dorr classification might be a descriptive tool of use but its relevance in guiding femoral stem fixation has diminished in the face of evolving implant technology and robust registry evidence. Multifactorial algorithms based on large-scale outcome data and patient factors are to be used in determining type of stem fixation rather than

relying on morphology alone.

The cement paradox is real and is not a failure to apply the Dorr classification; it is evident that the classification is irrelevant to real-world decision making.<sup>8</sup> Surgeons are not ignoring bone morphology; they are correctly recognising other powerful predictors.

**COMPETING INTERESTS**

Nil.

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