

COVID-19 impact on joint replacement surgery in Australia in 2020: a nationwide perspective

Joint replacement (JR) is one of the most common and successful surgical procedures performed in Australia, with over 115 000 primary procedures undertaken in 2019.¹ In 2020, most JR surgery was suspended in late March in response to Federal Government directives to allow only emergency and urgent surgery, which did not include elective JR.^{2,3} This suspension was gradually eased over subsequent months, which varied by jurisdiction.

The Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR) is uniquely positioned to monitor the impact of COVID-19 related restrictions on JR surgery across the country. AOANJRR data indicates that 5503 fewer primary hip, knee or shoulder replacements for OA (which excludes trauma-related replacements) were conducted nationwide in 2020 compared to 2019. As expected, the largest reduction occurred in April, with a 83.7% reduction in primary JRs due to OA compared to April 2019, equating to 6035 procedures (Fig. 1). June and July 2020 saw a rebound in the number of primary JRs for OA, increasing by 13.3% compared to the same period in 2019 (Fig. 1).

The impact of COVID-19 varied by State or Territory throughout the year (Fig. 2). In Victoria, a second-wave resurgence of COVID-19 led to elective surgery being temporarily re-suspended in July 2020 with a staggered reintroduction thereafter. Not surprisingly, Victoria experienced the largest reduction in JR; primary JR due to OA was down 4338 procedures (19.3%). In contrast, Tasmania, ACT and Queensland increased primary JR in 2020, principally due to substantial increases in activity in the second half of the year.

In addition to reductions in primary JR, the COVID-19 pandemic was associated with a major decline in revision replacement surgery, which is most commonly required for prosthetic loosening, fracture, instability/dislocation and infection.¹ AOANJRR data demonstrate that 1349 fewer hip, knee or shoulder revision procedures occurred in Australia in 2020, representing a 13.0% decrease from 2019.

Hip replacements for fracture were 101 fewer for 2020, a modest 1.2% reduction. Contrary to other types of JR, shoulder

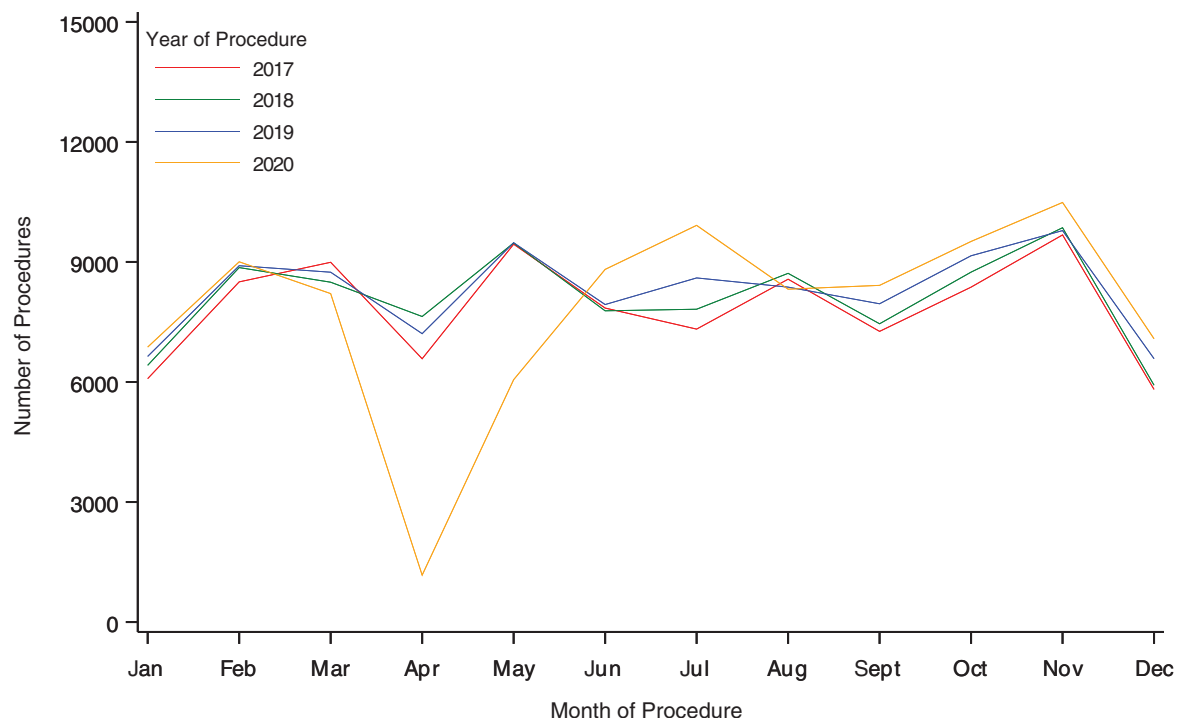


Fig 1. Primary hip, knee and shoulder replacements for OA.

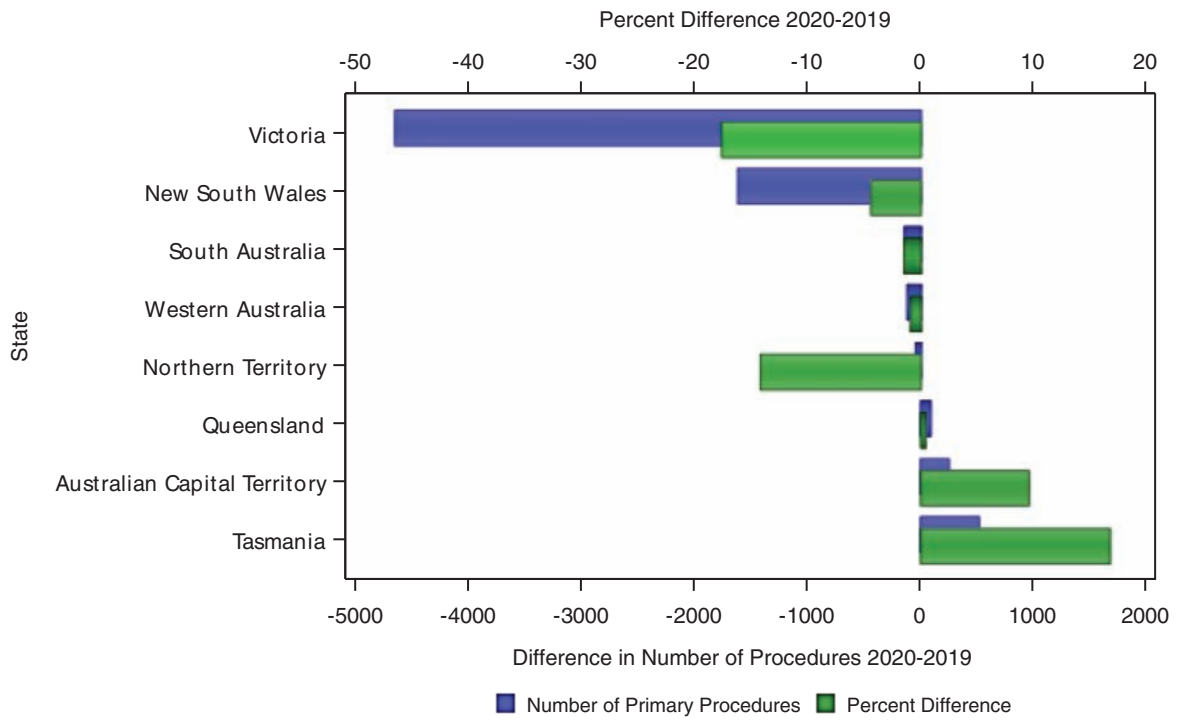


Fig 2. Change in primary hip, knee and shoulder replacements for OA by state or territory.

replacements secondary to trauma increased by 8.2% in 2020 (69 procedures). For the 3 months April to June 2020, shoulder replacement due to trauma decreased by 6.6%, but increased by

21.6% between July and September, possibly due to physical deconditioning during lockdown and subsequent increased physical activity and falls as COVID-19 restrictions eased.

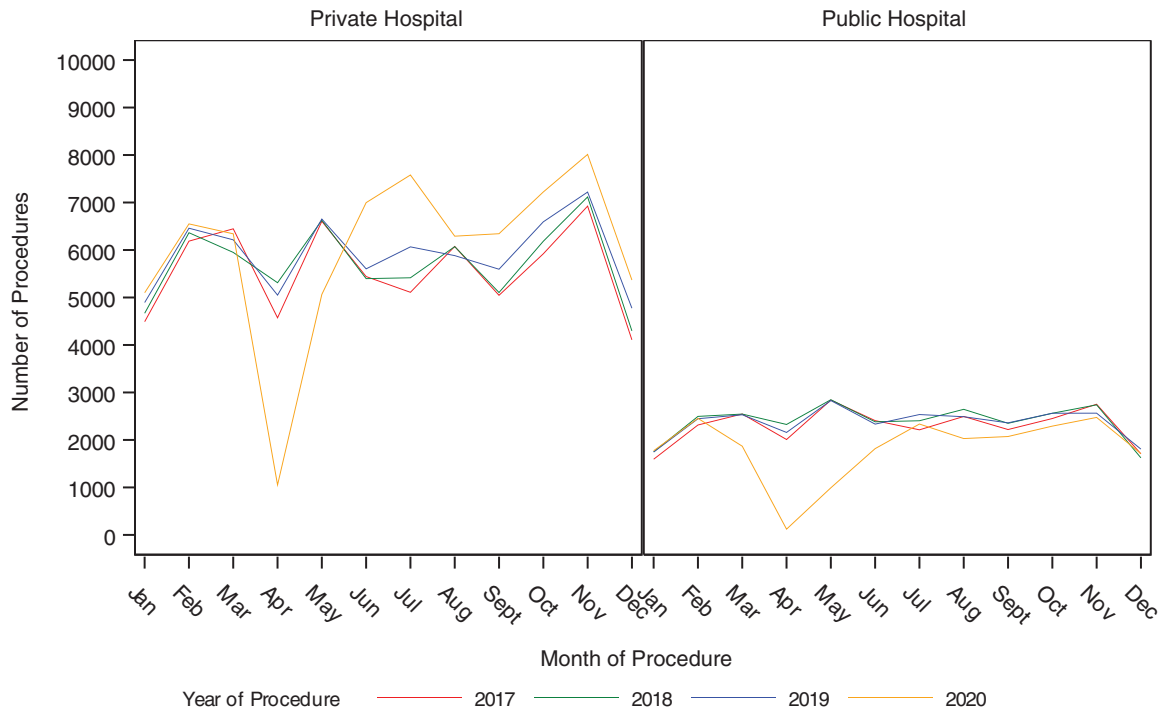


Fig 3. Primary hip, knee and shoulder replacements for OA for private and public hospitals.

Public hospitals experienced a greater reduction in JRs than private hospitals in 2020 (Fig. 3). Private hospitals, where approximately two-thirds of JR are performed nationally, rapidly recommenced JR surgery when restrictions eased. In June and July 2020, primary JR for OA exceeded June 2019 levels by 24.9% and 25.0%, respectively, in private hospitals and remained higher than 2019 levels for the remainder of the year. In contrast, primary JR conducted in public hospitals remained below 2019 levels for the entire period March to December. At year's end, primary JR in public hospitals was down 22.6% (6422 procedures), whereas private hospitals increased throughput by 1.3% nationally (919 procedures).

Postponing elective surgery inevitably increases the backlog of people awaiting JR, compounding the effects of increasing demand for JR. Allowing for average year-on-year increases in demand for JR surgery, 102 566 primary hip, knee or shoulder replacements were expected to be performed for OA in 2020¹; actual replacements were 8.5% lower (8706 procedures). This unmet need will need to be absorbed by health services over coming months and potentially years. Based on 2020 data, public health services and Victorian health services will be particularly challenged due to the larger reduction in surgical numbers that occurred in these services. Private health services appear better equipped to rapidly increase JR volume and might be able to assist with managing public patients. Ongoing COVID-related restrictions and surgical delay in 2021 and beyond will extend the impact of the pandemic, which will vary according to the spread of the virus in each State and Territory and each jurisdiction's governmental response.

Delaying elective JR surgery prolongs pain and disability, and challenges the notion of what is considered 'elective' surgery. People awaiting JR typically experience moderate to severe joint pain, moderate to severe problems with common activities such as walking, marked reductions in quality of life and psychological distress.^{4,5} The number of patients waiting JR whose health state equated to 'worse than death' nearly doubled in the UK since the onset of the pandemic, and now represents one-quarter to one-third of patients.⁶ Given that JR can dramatically reduce pain and improve function,^{4,5,7} delaying surgery inevitably defers substantial gains in quality of life and productivity.⁸

Despite its challenges, delayed surgery due to the pandemic represents an opportunity to ensure that appropriate non-surgical interventions are adequately trialled prior to surgery. Guideline-recommended care includes education, exercise, weight management, walking aids and pain medications.⁹ Appropriately delivered non-surgical interventions may delay the need for JR surgery and potentially improve postoperative outcomes.¹⁰

Protecting vulnerable populations from contracting COVID-19 is particularly relevant for people awaiting JR surgery. People undergoing JR may be at higher risk of contracting severe COVID-19 due to their older age, obesity and comorbidities.^{1,11} People with COVID-19 are at higher risk of postoperative complications than people without the disease, particularly in older adults.¹² Delaying surgery for at least 7 weeks following COVID-19 infection has

been recommended.¹³ Prioritizing preoperative vaccination of patients awaiting elective surgery may prevent COVID-19-related deaths.¹⁴

The COVID-19 pandemic has caused profound changes to healthcare delivery and JR surgery is no exception. Responding to the pandemic's 'knock-on effects' will take similar levels of innovation, team work and coordinated funding as those required in response to the direct effects of the pandemic. Assessing the effects of the pandemic using AOANJRR data will continue to assist health care providers, administrators and governments to design and implement appropriate, prioritized and evidence-based responses.

Data Availability Statement

Data may be provided upon reasonable request to the authors.

Author Contributions

Stephen Gill: Conceptualization; project administration; writing – original draft; writing – review and editing. **Stephen Graves:** Conceptualization; writing – review and editing. **Michelle Lorimer:** Data curation; formal analysis; writing – review and editing. **Richard de Steiger:** Writing – review and editing. **Ilana Ackerman:** Writing – review and editing. **Andrew Ellis:** Writing – review and editing. **Richard Page:** Conceptualization; writing – review and editing.

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Designing a better incision for proximal tibial osteosarcoma resection and reconstruction: a reminder of the skin’s vascular anatomy

Functional limb reconstruction, rather than amputation, has become the ‘gold standard’ in bony sarcoma management.¹ This is particularly true in the paediatric setting. The resection and reconstruction

of massive sarcoma defects in the proximal tibia and knee are particularly complex. This weight-bearing construct requires a sound osseo-articular column, an intact extensor mechanism and robust

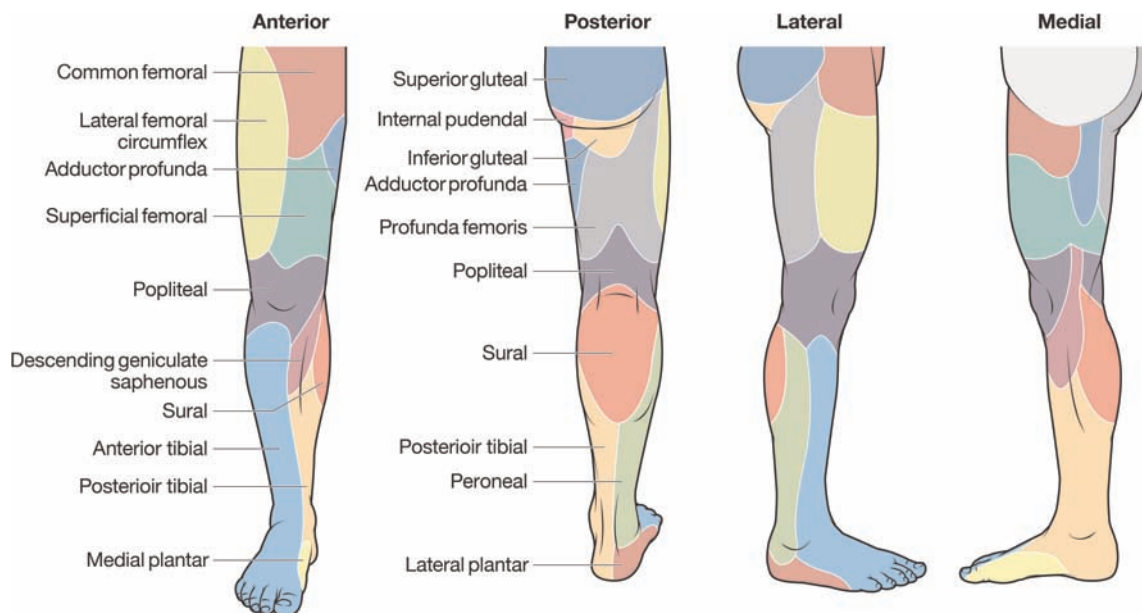


Fig. 1. The relevant angiosomal territories in the leg (Adapted from Taylor *et al.*,⁶ with permission).