

# Distal Radius Fractures in a Functional Quadruped Spanning Bridge Plate Fixation of the Wrist



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## KEYWORDS

• Distal radius fractures • Functional quadruped • Spanning bridge plate fixation • Wrist

## KEY POINTS

- Functional quadrupeds are patients who require full weight bearing with all 4 extremities in order to mobilize and bear weight.
- A functional quadruped can be someone who is walker dependent to mobilize or patients with polytrauma temporarily needing their upper extremities to bear weight and mobilize with crutches or a walker.
- In a functional quadruped, distal radius fractures can be treated with a dorsal spanning bridge plate for any fracture pattern to allow immediate unrestricted weight bearing with the injured upper extremity.
- In the authors' series, there were no cases of nonunions, tendon ruptures, or reoperations other than the planned staged bridge plate removal.
- Dorsal spanning bridge plate fixation of distal radius fractures in the functional quadruped is a viable treatment strategy for immediate weight bearing with the injured limb and, in the authors' series, demonstrates satisfactory results.

## INTRODUCTION

The prevalence of distal radius fractures continues to increase as the average age of the US population increases.<sup>1</sup> Among patients more than 65 years of age, distal radius fractures account for 18% of all fractures.<sup>2</sup> Although there is an increasing trend toward treating distal radial fractures operatively, elderly patients are better able to tolerate malunion compared with younger patients relative to ultimate functional outcomes.<sup>3–5</sup> The treatment of distal radius fractures includes nonoperative treatment with splint or cast immobilization as well as multiple operative options with surgical fixation. Broadly, the indications for surgical fixation of a distal radius

fracture include unstable and/or displaced fractures. However, additional surgical indications for distal radius fractures include polytrauma patients and walker-dependent elderly patients, both needing the use of their hands for weight bearing and mobilization, that is, a *functional quadruped*. A quadruped is an animal with 4 feet, and humans are, by definition, biped. However, patients with lower-extremity injuries and/or patients who normally depend on assistive devices, such as a walker, are essentially a functional quadruped, as they require all 4 limbs in order to mobilize and ambulate.

A functional quadruped with a distal radius fracture, irrespective of fracture pattern specifics,

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Ethical Board Review Statement: No animals or human subjects.

Conflict of Interest Statement: An author of this study (A.M.I.) serves as design surgeon and paid consultant for Globus (Audobon, PA, USA).

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poses a unique challenge. Standard surgical fixation options of the distal radius include closed reduction and pinning with casting, external fixation, fragment-specific fixation, intramedullary nailing, and various plating options, including volar, dorsal, and radial plates.<sup>6</sup> However, except for external fixation, the other surgical options for the distal radius do not necessarily afford immediate weight bearing with an assistive device like a cane, crutch, or walker. In these settings, an alternative surgical fixation option is the use of a spanning dorsal bridge plate.<sup>7,8</sup>

The concept of dorsal spanning or bridge plate fixation of distal radius fractures is not new and was initially described to manage either highly comminuted fractures of the distal radius and/or serve as an alternative to cases requiring prolonged external fixation as an internal fixator instead.<sup>7,9</sup> This technique has evolved, and its indications have expanded to include polytrauma patients with the particular goal of earlier weight bearing with the injured upper extremity and improved rehabilitation.<sup>10</sup> The traditional technique used an Association for Osteosynthesis (AO)/Association for the Study of Internal Fixation's 3.5-mm dynamic compression plate (DCP) applied in a noncompression fashion (Fig. 1). More recently, contoured low-profile locking plates have become available, increasing its ease

of application and the application in functional quadruped patients with a distal radius fracture (Fig. 2).<sup>8</sup>

## INDICATIONS AND CONTRAINDICATIONS

The relative indication for a dorsal spanning bridge plate fixation of a distal radial fracture includes any patient with a distal radius fracture who is a functional quadruped requiring full weight bearing on the injured extremity in order to ambulate with an assistive device. In these patients, the goal is immediate unrestricted weight bearing; thus, any distal radius fracture is indicated. Additional treatment options specific to the use of a dorsal spanning bridge plate include complex articular fractures and/or fractures with significant meta-diaphyseal comminution or bone loss.<sup>7,8</sup> Contraindications include patients with large open dorsal wounds that would result in exposed hardware.

## TECHNIQUE

Either a small-fragment 3.5-mm locking DCP or a commercially available precontoured locking distal radius bridge plate can be used (Fig. 3). The authors' preference is the latter, as they are lower in profile, easier to place, and allow for the use of smaller screws. Metacarpal fixation with



**Fig. 1.** A high-energy comminuted distal radius and ulna fracture in a polytrauma patient with an ipsilateral tibial plateau fracture and contralateral patella fracture, with interval dorsal spanning bridge plate application using a locking DCP, allowing immediate weight-bearing of the injured upper extremity on crutches.

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