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AAOS Appropriate Use Criteria: Treatment of Distal Radius Fractures

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Abstract

The American Academy of Orthopaedic Surgeons (AAOS) has developed an Appropriate Use Criteria (AUC) for *the Treatment of Distal Radius Fractures*. Evidence-based information, in conjunction with the clinical expertise of physicians, was used to develop the criteria to determine the appropriateness of various treatments in the management of distal radius fractures. *The Appropriate Use Criteria for the Treatment of Distal Radius Fractures* were derived by identifying clinical indications typical of patients with a distal radius fracture in clinical practice. These indications were most often variables observable by the clinician, including symptoms or results of diagnostic tests. Additionally, “patient-level variables” (e.g., activity level or demographics) can be considered. The 2,160 patient scenarios and 9 treatments were developed by the writing panel, a group of clinicians who are specialists in this AUC topic. Next, a separate, multidisciplinary, voting panel (made up of specialists and non-specialists) rated the appropriateness of treatment of each patient scenario using a 9-point scale to designate a treatment as “Appropriate” (median rating, 7 to 9), “May Be Appropriate” (median rating, 4 to 6), or “Rarely Appropriate” (median rating, 1 to 3).

Overview and Rationale

The *Appropriate Use Criteria for the Treatment of Distal Radius Fractures* was approved by the American Academy of Orthopaedic Surgeons (AAOS) Board of Directors on August 31, 2021. The purpose of this AUC is to help determine the appropriateness of diagnostic decisions and treatment not covered by the clinical practice guideline recommendations for

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Disclosures:

Lauren Michelle Shapiro, MD (Candidate Member):

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AAOS: Board or committee member

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the heterogeneous patient population routinely seen in practice. Evidence-based information, in conjunction with the clinical expertise of physicians from multiple medical specialties, was used to develop the criteria in order to improve timely diagnosis and treatment and minimize morbidity while considering the subtleties and distinctions necessary in making clinical decisions. To provide an evidence-based foundation for this AUC, the AAOS Department of Clinical Quality and Value provided the writing and voting panels with the *AAOS Clinical Practice Guideline for the Management of Distal Radius Fractures*. AAOS staff convened the independent volunteer physician writing and voting panels that developed this AUC.

AAOS created this AUC to determine the appropriateness of various treatments in the management of distal radius fracture. The AUC does not address patients with a malunion or pediatric patients. It is important to note that the AUC are intended to incorporate and be utilized with a thorough patient history, physical exam, and radiographic findings observed by clinicians managing patients with distal radius fractures. These criteria are intended to be utilized as a guide for those treating patients with distal radius fractures and are not intended to be comprehensive or a fixed protocol. As such, this AUC should be understood and utilized in the context of a patient's functional status, goals, and treatment preferences. While the clinician's independent judgement should be utilized to guide care, the AUC can be referenced and employed within shared decision-making models to augment the treatment of patients with distal radius fractures.¹⁻³

Potential Harms and Contradictions

No one aspect of a patient's care and work up (comorbidities, history, physical exam, or radiographic findings) drives care decisions independently. Additionally, each diagnostic consideration has differential impact based on the clinical factors included in the AUC. As such, the consideration of many of the above, in the context of the patient's goals, risk tolerances, and treatment preferences, should inform patient-specific treatment decisions. Improperly treated distal radius fractures may lead to a variety of issues that include not only chronic pain or decreased function, but also increased cost and an over-utilization of healthcare resources. In an era of value-based care and high-deductible health insurance plans, treatment decisions with limited evidence (e.g. serial radiography, supervised therapy) should be used on a case-by-case basis⁴.

Methods

The AAOS uses the RAND/UCLA Appropriateness Method (RAM) to assess the appropriateness of a particular treatment.⁵ Two panels participated in the development of the AAOS AUC for *the Treatment of Distal Radius Fractures*. Members of the writing panel developed a list of 2,160 patient scenarios, for which the appropriateness of 9 treatments were evaluated. The voting panel participated in two rounds of voting. During the first round of voting, the panel was given approximately one month to independently rate the appropriateness of each of the provided treatments of each of the relevant patient scenarios via an electronic ballot. After the first round of appropriateness ratings were submitted,

AAOS staff calculated the median ratings for each patient scenario and specific treatment. A virtual voting panel meeting was held on Saturday, June 5, 2021.

During this meeting, voting panel members addressed the scenarios/treatments that generated disagreement after the first round of voting. Disagreements occurred when panel members' ratings were distributed on both the "rarely appropriate" and "appropriate" spectrums of the rating scale. The voting panel members discussed the list of assumptions, patient indications, and treatments to identify areas that needed to be clarified/edited so there was a common understanding of assumptions, patient indications, and treatments. After the discussion and subsequent changes, the group completed a second round of appropriateness voting. There was no attempt to obtain consensus about appropriateness.

Indications and Classifications

Table 1 provides the list of patient indications and classifications developed by the *Treatment of Distal Radius Fractures AUC Panels*.

Treatment

It is important to note that the clinical practice guideline discussing fixation technique provides strong evidence that there is no significant difference in radiographic or patient-reported outcomes between fixation techniques for complete articular or unstable distal radius fractures with the caveat that at three months volar locking plates result in earlier recovery of function. As such, while the AUC helps guide treatment options, the specific technique chosen (when surgical fixation is performed) should be guided by fracture pattern and patient characteristics. The following treatment options are addressed within the Treatment of Distal Radius Fractures AUC:

1. Immobilization without reduction – This entails immobilizing the wrist in an orthosis without attempts at improving any fracture displacement.
2. Reduction and immobilization – This treatment typically includes local anesthesia about the fracture, along with manual reduction of the distal radius in an attempt to reduce fracture displacement and maintain fracture length and alignment with placement of an orthosis.
3. Percutaneous pinning – Percutaneous pinning is typically employed after fracture reduction. Pinning includes the placement of Kirshner wires through the skin across intraarticular and/or extraarticular fracture to maintain fracture reduction. Pins can be buried or left outside of the skin and removed after fracture healing.
4. Spanning external fixator – An external fixator allows for maintenance of length, alignment, and rotation of a distal radius fracture without requiring hardware be placed at the site of the fracture. This can be beneficial in scenarios with soft tissue damage that preclude the safe placement of internal fixation. A fixator can be removed in clinic or in the operating room after the fracture has healed.
5. Dorsal Spanning Bridge/Wrist Plate – A dorsal spanning bridge/wrist plate, similar to a spanning external fixator, serves to provide axial stability and

maintenance of fracture reduction via ligamentotaxis across the wrist joint. Because of its internal nature it provides a biomechanical advantage to external fixation while also avoiding percutaneous hardware. A bridge plate is removed in the operating room after fracture healing.

6. Dorsal Plate – Plates on the dorsal distal radius can be used for rigid internal fixation and are often used in conjunction with a dorsal radiocarpal joint arthrotomy to aid in articular reduction.
7. Fragment Specific Fixation – Fragment specific fixation incorporates the use of load-sharing implants to treat individual fracture fragments independently and can be placed on the volar, dorsal, or radial sides of the radius.
8. Intramedullary Nail – An intramedullary nail is a device inserted through the radial styloid into the intramedullary canal of the distal radius to aid in maintaining reduction for extraarticular fracture patterns.
9. Volar locking plate – The volar locking plate is currently the most commonly utilized option for surgical fixation of distal radius fractures. It is placed on the volar surface of the distal radius and allows for neutralization of forces via a fixed angle construct by transmitting forces from the distal fragments to the volar cortex of the radial shaft.

Results of Appropriateness Ratings

Out of 2,160 total voting items, 888 (41%) were rated as “Appropriate”, 734 (34%) were rated as “May Be Appropriate”, and 538 (25%) voting items were rated as “Rarely Appropriate” (Table 2). Additionally, the voting panel members were in statistical agreement on 774 (36%) voting with 44 (2%) statistical disagreement on voting items (Table 3). The final appropriateness ratings assigned by the 8 voting panel members of the AAOS *Treatment of Distal Radius Fractures* AUC can be accessed via the web-based mobile application www.orthoguidelines.org.

As part of dissemination efforts for the AAOS *Treatment for Distal Radius Fractures* AUC, this web-based mobile platform was developed to provide physicians with immediate access to information to assist them with providing evidence-based patient care. The mobile platform includes the list of patient indications and treatment recommendations. After the clinician enters a patient profile specifying clinical symptoms (e.g., AO/OTA Fracture Type, Mechanism of Injury, Pre-Injury Activity Level of Patient, Patient Health, and Other Injuries in addition to distal radius fracture), a list of treatment recommendations is provided. For the selected patient profile, green circle checkmarks reflect appropriate treatments, yellow caution symbols reflect treatments that may be appropriate, and red circled X’s reflect treatments that are rarely considered appropriate.

The complete Appropriate Use Criteria for *the Treatment of Distal Radius Fractures* including all tables, figures, and appendices, as well as the details of the methods used to prepare this AUC is available at <https://www.aaos.org/drfauc>

Treatment of Distal Radius Fractures Writing Panel:

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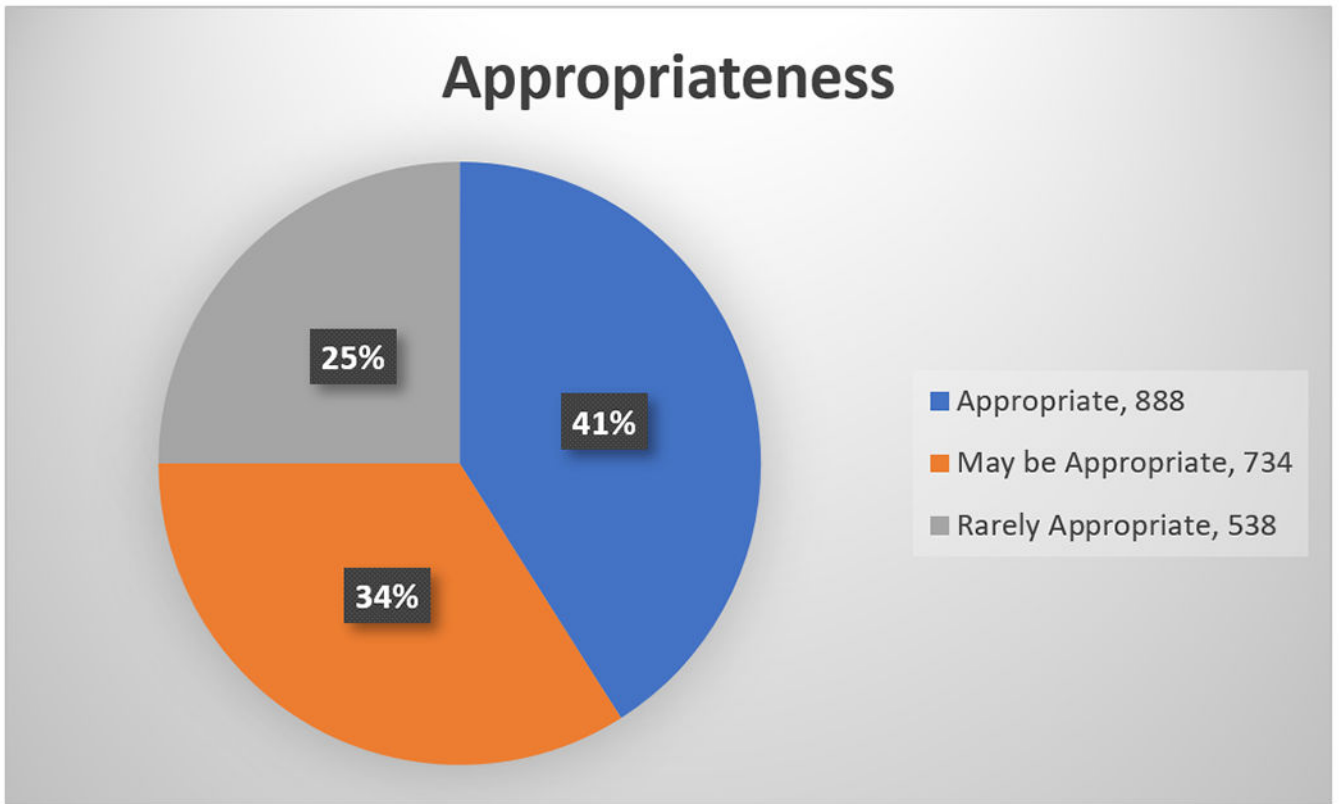
Table 1.

Indication profile of Distal Radius Fractures

Indication	Classification
AO/OTA FRACTURE TYPE	1. Type A AO/OTA Fracture
	2. Type B AO/OTA Fracture
	3. Type C AO/OTA Fracture
MECHANISM OF INJURY	1. High-energy Fracture
	2. Low-energy Fracture
PRE-INJURY ACTIVITY LEVEL OF PATIENT	1. High Functional Activity
	2. Normal Independent Activity
	3. Normal Dependent Activity
	4. Low Functional Activity
PATIENT HEALTH	1. ASA 1-2
	2. ASA 3-4
OTHER INJURIES (IN ADDITION TO DISTAL RADIUS FRACTURE)	1. Median Neuropathy
	2. Gustilo Anderson Type I or II Open Fracture
	3. Gustilo Anderson Type III Open Fracture
	4. Other Multi-trauma Injury
	5. No Associate Injuries
TREATMENTS	1. Spanning External Fixation
	2. Percutaneous Pinning
	3. Dorsal Spanning Bridge/Wrist Plate
	4. Volar Locking Plate
	5. Dorsal Plate
	6. Fragment Specific Fixation
	7. Intramedullary Nail
	8. Immobilization without Reduction
	9. Reduction and Immobilization

Table 2.

Breakdown of Appropriateness Ratings



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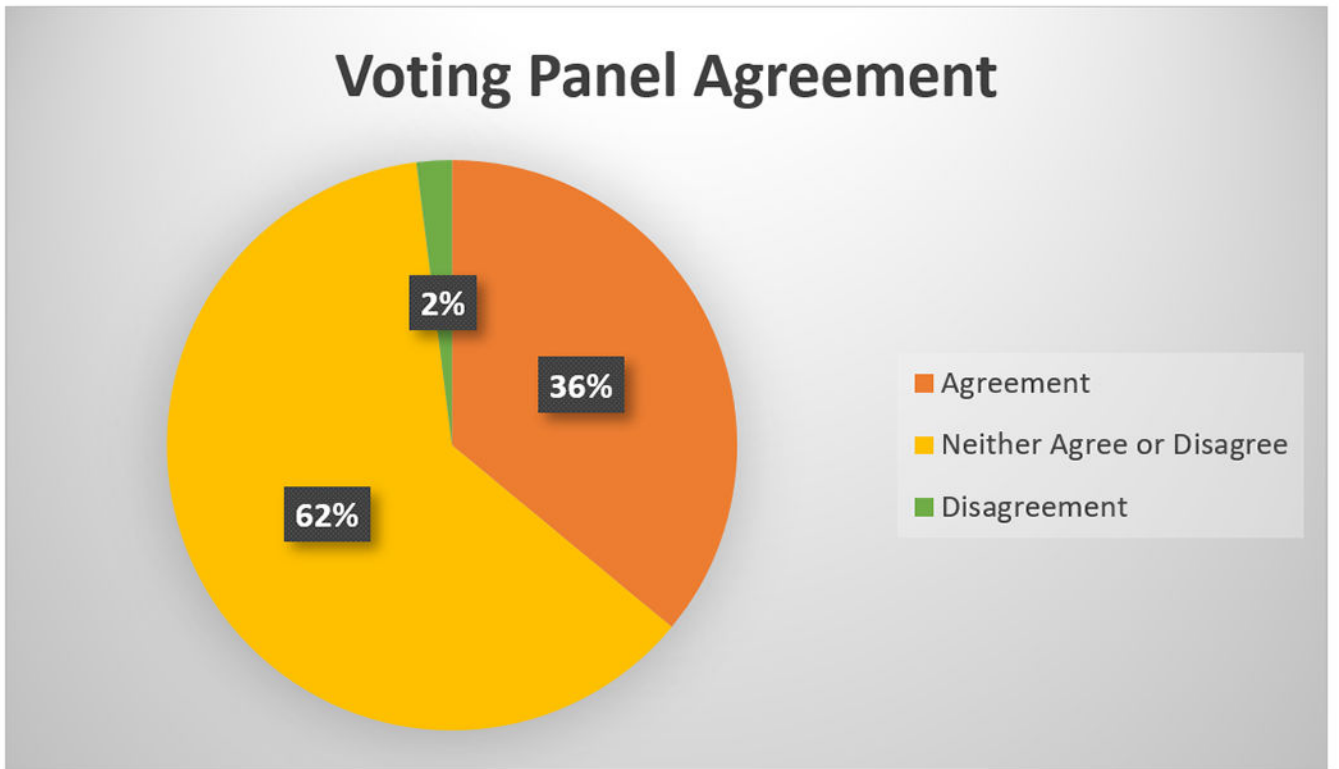
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Table 3.

Breakdown of Agreement Amongst Voting Panel



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