

Defining displacement thresholds for surgical intervention for distal radius fractures - a Delphi study

Introduction

Thank you for agreeing to take part in this Delphi study.

The aim of the study is:

To investigate surgeon's opinions and obtain consensus regarding how much displacement shouldbe accepted in distal radius fractures before intervention is required.

We will aim to <u>quantify</u> how much displacement can be accepted before intervention is required for different patient groups.

This will provide quidance and reduce variation between treating surgeons.

There will be **3 rounds** of questionnaires based around **6 simple case vignettes**. Each round will take place approximately **4 weeks** following the previous round.

Feedback will be provided throughout. We estimate each questionnaire will takeless than 20 minutes to complete and are likely to get shorter with each subsequent round.

By intervention, we mean: any form of manipulation or surgical fixation.

For each case, please consider the functional outcome at **3 months post injury** in a patient with no *complications*, who had *no wrist problems* and *normal wrist anatomy* before the injury.

Any data you give will be protected and secured confidentially by the research team.

We are extremely grateful for your time and support.

Mr Nick Johnson Chief Investigator Honorary Academic Fellow Trauma & Orthopaedics

Professor Joseph Dias
Professor of Hand & Orthopaedic Surgery
University Hospitals of Leicester



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Extra-Articular Fractures of the Distal Radius

This page asks about the factors affecting **Extra-Articular** Fractures. There are 3 cases of patients of varied ages.

The radiological parameters used in these 3 cases are described below.

When providing a measurement at which you would intervene give the **absolute value** for that radiological measurement.

Please use + or – to indicate positive or negative ulnar variance and negative values to indicate dorsal tilt.

Please assume all patients in the cases had normal wrist anatomy*before injury* with parameters of the following values:

Radial height: 11 mm Ulnar variance: 0 mm

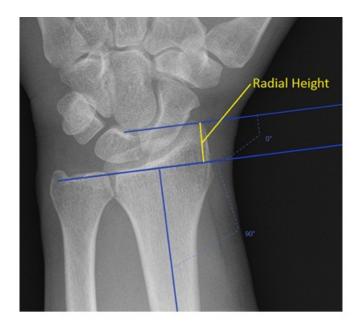
Radial inclination: 22 degrees

Dorsal tilt: 11 degrees Intra-articular gap/step: nil

Radial height

On a PA view this is the vertical distance between:

- the tip of the radial styloid
- a line tangential to the ulnar corner of the lunate fossa



<u>Ulnar variance</u>

On a PA view this is the vertical distance between:

- a line tangential to the articular surface of the ulna and perpendicular to the long axis of the radius
- a line tangential to the ulnar corner of the lunate fossa of the radius and perpendicular to the long axis of the radius



Radial Inclination

On a PA view this is the angle between:

- a line drawn from the tip of the radial styloid to the medial edge of the articular corner of the radius
- a line perpendicular to the long axis of the radius



Dorsal tilt

On a lateral view this is the angle between:

- a line drawn between the most distal points of the dorsal and volar lips of the distal radius
- a line perpendicular to the long axis of the radius



Case 1: A **38 year old** patient sustains a displaced **extra-articular** fracture of the distal radius.

	al outcome for this patient?	njury to prevent an adverse
	e scale (0=extremely unimportant, 10=extremely into the appropriate position, or enter a numerical rate	'
0	Importance of Radial Height	10
	is restoring ulnar variance to the position prior to all outcome for this patient?	injury to prevent an adver
	e scale (0=extremely unimportant, 10=extremely i at the appropriate position, or enter a numerical rat	•
0	Importance of Ulnar Variance	10
Please rate on the	functional outcome for this patient? e scale (0=extremely unimportant, 10=extremely in	
Click on the line a	at the appropriate position, or enter a numerical rat	. ,
o	nt the appropriate position, or enter a numerical rat Importance of Radial Inclination	. ,
o * 5. How important	Importance of Radial	ing in the textbox.
* 5. How important effect on functional Please rate on the	Importance of Radial Inclination is restoring dorsal tilt to the position prior to injury	ting in the textbox. 10 y to prevent an adverse mportant)
* 5. How important effect on functional Please rate on the	Importance of Radial Inclination is restoring dorsal tilt to the position prior to injury al outcome for this patient? e scale (0=extremely unimportant, 10=extremely in	ting in the textbox. 10 y to prevent an adverse mportant)

6. At what measurement of displacement of radial height would you in	tervene surgically?
I would not intervene (irrespective of the amount of displacement)	
I would intervene (irrespective of the amount of displacement)	
If you would intervene only with a certain amount of displacement, then what would be your intervention?	threshold of displacement for
(Please answer in mm)	
7. At what measurement of displacement of ulnar variance would you	intervene surgically?
I would not intervene (irrespective of the amount of displacement)	
I would intervene (irrespective of the amount of displacement)	
If you would intervene only with a certain amount of displacement, then what would be your intervention?	threshold of displacement for
(Please answer in mm and indicate with + or - for positive or negative ulnar variance respec	ctively)
8. At what measurement of displacement of radial inclination would yo	ou intervene surgically?
I would not intervene (irrespective of the amount of displacement)	ou mierverne eurgreumy r
I would intervene (irrespective of the amount of displacement)	
If you would intervene only with a certain amount of displacement, then what would be your intervention?	threshold of displacement for
(Please answer in degrees)	
At what measurement of displacement of dorsal tilt would you intervene	ene surgically?
I would not intervene (irrespective of the amount of displacement)	
I would intervene (irrespective of the amount of displacement)	
If you would intervene only with a certain amount of displacement, then what would be your intervention?	threshold of displacement for
(Please answer in degrees and use negative values to indicate dorsal angulation)	

10. Please enter a	ny comments regarding this case not captured a	above.
Case 2: A 58 v e	ear old patient sustains a displaced	extra-articular
fracture of the d	·	
* 11. (Please note a questions.)	that the age of the patient is different from th	at of the previous
•	estoring radial height to the position prior to injul outcome for this patient?	ury to prevent an adverse
	scale (0=extremely unimportant, 10=extremely the appropriate position, or enter a numerical ra	,
0	Importance of Radial Height	10
adverse effect on	is restoring ulnar variance to the position prior functional outcome for this patient?	, , ,
	scale (0=extremely unimportant, 10=extremely the appropriate position, or enter a numerical ra	' '
0	Importance of Ulnar Variance	10

•	s restoring radial inclination to the position nctional outcome for this patient?	n prior to injury to prevent a
	scale (0=extremely unimportant, 10=extrem he appropriate position, or enter a numeric	• • •
0	Importance of Radial Inclination	10
•	s restoring dorsal tilt to the position prior to outcome for this patient?	o injury to prevent an advers
	scale (0=extremely unimportant, 10=extrem he appropriate position, or enter a numeric	• • •
0	Importance of Dorsal Tilt	10
I would intervene (irr	e (irrespective of the amount of displacement) respective of the amount of displacement) y with a certain amount of displacement, then what wo	uld be your threshold of displaceme
(Please answer in mm)		
16. At what measure	ement of displacement of ulnar variance w	vould you intervene surgical
	e (irrespective of the amount of displacement)	
I would intervene (irr	respective of the amount of displacement)	
If you would intoryong onl	wwith a partain amount of diaple amont, then what wa	uld be your threshold of displaceme
intervention?	y with a certain amount of displacement, then what wo	

17. At what measurement of displacement of radial inclination would you intervene surgically?
I would not intervene (irrespective of the amount of displacement)
I would intervene (irrespective of the amount of displacement)
f you would intervene only with a certain amount of displacement, then what would be your threshold of displacement for ntervention?
(Please answer in degrees)
18. At what measurement of displacement of dorsal tilt would you intervene surgically?
I would not intervene (irrespective of the amount of displacement)
I would intervene (irrespective of the amount of displacement)
f you would intervene only with a certain amount of displacement, then what would be your threshold of displacement for ntervention?
Please answer in degrees and use negative values to indicate dorsal angulation)
19. Please enter any comments regarding this case not captured above.
ase 3: A 75 year old patient sustains a displaced extra-articular
acture of the distal radius.

* 20. (Please note the questions)	at the age of the patient is different from th	at of the previous
•	storing radial height to the position prior to injudent outcome for this patient?	ury to prevent an adverse
	cale (0=extremely unimportant, 10=extremely ne appropriate position, or enter a numerical ra	. ,
0	Importance of Radial Height	10
•	restoring ulnar variance to the position prior nctional outcome for this patient?	to injury to prevent an
	cale (0=extremely unimportant, 10=extremely ne appropriate position, or enter a numerical ra	•
0	Importance of Ulnar Variance	10
·	s restoring radial inclination to the position pr nctional outcome for this patient?	ior to injury to prevent an
	cale (0=extremely unimportant, 10=extremely ne appropriate position, or enter a numerical ra	' '
0	Importance of Radial Inclination	10
•	s restoring dorsal tilt to the position prior to injoutcome for this patient?	jury to prevent an adverse
	cale (0=extremely unimportant, 10=extremely ne appropriate position, or enter a numerical ra	. ,
0	Importance of Dorsal Tilt	10

24. At what measurement of displacement of radial height would you intervene surgically?
I would not intervene (irrespective of the amount of displacement)
I would intervene (irrespective of the amount of displacement)
If you would intervene only with a certain amount of displacement, then what would be your threshold of displacement for intervention?
(Please answer in mm)
25. At what measurement of displacement of ulnar variance would you intervene surgically?
I would not intervene (irrespective of the amount of displacement)
I would intervene (irrespective of the amount of displacement)
If you would intervene only with a certain amount of displacement, then what would be your threshold of displacement for intervention?
(Please answer in mm and indicate with + or - for positive or negative ulnar variance respectively)
I would not intervene (irrespective of the amount of displacement)
I would intervene (irrespective of the amount of displacement)
If you would intervene only with a certain amount of displacement, then what would be your threshold of displacement for intervention?
(Please answer in degrees)
27. At what measurement of displacement of dorsal tilt would you intervene surgically?
I would not intervene (irrespective of the amount of displacement)
I would intervene (irrespective of the amount of displacement)
If you would intervene only with a certain amount of displacement, then what would be your threshold of displacement for intervention?
(Please answer in degrees and use negative values to indicate dorsal angulation)

28. Please enter any comments regarding this case not captured above.	



Defining displacement thresholds for surgical intervention for distal radius fractures - a Delphi study

Intra-Articular Fractures of the Distal Radius

This page asks about the measurements affecting Intra-Articular Fractures. There are 3 cases of patients of varied ages.

* 29. Case 4: A **38 year old patient** sustains a displaced <u>intra</u>-articular fracture of the distal radius.

(Please note that both the <u>injury</u> and <u>age</u> of the patient are now <u>different</u>.)

How important is reducing the **intra-articular step** to prevent an adverse effect on functional outcome for this patient?

Please rate on the scale (0=extremely unimportant, 10=extremely important)

Click on the line at the appropriate position, or enter a numerical rating in the textbox.

0	Importance of Step	10

* 30. How important is reducing the **intra-articular gap** to prevent an adverse effect on functional outcome for this patient?

Please rate on the scale (0=extremely unimportant, 10=extremely important)

Click on the line at the appropriate position, or enter a numerical rating in the textbox.

0	Importance of Gap	10	

31. At what n surgically?	neasurement of displacement of intra-articular step would you intervene
would not	intervene (irrespective of the amount of displacement)
I would inte	rvene (irrespective of the amount of displacement)
If you would inter intervention?	rvene only with a certain amount of displacement, then what would be your threshold of displacement for
(Please answer i	n mm)
32. At what n surgically?	neasurement of displacement of intra-articular gap would you intervene
would not	intervene (irrespective of the amount of displacement)
I would inte	rvene (irrespective of the amount of displacement)
If you would inter intervention?	rvene only with a certain amount of displacement, then what would be your threshold of displacement for
(Please answer i	n mm)
(
33. Please er	nter any comments regarding this case not captured above.

	A 58 year old patient sustains the distal radius.	a displaced <u>intra</u> -a	articular
(Please note tha	at the <u>age</u> of the patient is <u>different</u> from t	that of the previous ques	tions)
How important i	s reducing the intra-articular step to prespect patient?	event an adverse effect o	on functional
	the scale (0=extremely unimportant, 10=e at the appropriate position, or enter a nu	• • • • • • • • • • • • • • • • • • • •	tbox.
0	Importance of Step	10	
35. How imports outcome for this	ant is reducing the intra-articular gap to spatient?	prevent an adverse effe	ct on functional
	the scale (0=extremely unimportant, 10=e at the appropriate position, or enter a nu	• • • • • • • • • • • • • • • • • • • •	tbox.
0	Importance of Gap	10	
36. At what measurgically?	asurement of displacement of intra-artic	ular step would you inte	rvene
I would not into	ervene (irrespective of the amount of displacement)		
I would interve	ne (irrespective of the amount of displacement)		
If you would interver intervention?	ne only with a certain amount of displacement, then w	what would be your threshold of	displacement for
(Please answer in m	m)		

I would not interv	vene (irrespective of the amount of displacement)	
I would intervene	e (irrespective of the amount of displacement)	
If you would intervene intervention?	only with a certain amount of displacement, then what would be your thresh	nold of displacement f
(Please answer in mm	n)	
38. Please enter	any comments regarding this case not captured above.	
39. Case 6: A	75 year old patient sustains a displaced int	<u>ra</u> -articular
fracture of th	ne distal radius.	
(Please note that	the <u>age</u> of the patient is <u>different</u> from that of the previous	questions)
•	reducing the intra-articular step to prevent an adverse ef	,
How important is outcome for this p	reducing the intra-articular step to prevent an adverse ef	fect on functiona
How important is outcome for this p	reducing the intra-articular step to prevent an adverse effortient? e scale (0=extremely unimportant, 10=extremely important)	fect on functional
How important is outcome for this purpose rate on the Click on the line at the Click on t	reducing the intra-articular step to prevent an adverse efficient? e scale (0=extremely unimportant, 10=extremely important at the appropriate position, or enter a numerical rating in the Importance of Step nt is reducing the intra-articular gap to prevent an adverse	fect on functional) e textbox.
How important is outcome for this purpose of the purpose of the purpose of the line at the control of the purpose of the purpo	reducing the intra-articular step to prevent an adverse efficient? e scale (0=extremely unimportant, 10=extremely important at the appropriate position, or enter a numerical rating in the Importance of Step nt is reducing the intra-articular gap to prevent an adverse	fect on functiona) e textbox.
How important is outcome for this particle on the line at the line	reducing the intra-articular step to prevent an adverse efficient? e scale (0=extremely unimportant, 10=extremely important at the appropriate position, or enter a numerical rating in the importance of Step Importance of Step at is reducing the intra-articular gap to prevent an adverse patient? e scale (0=extremely unimportant, 10=extremely important)	fect on functiona e textbox. e effect on function
How important is outcome for this particle on the line at the line	reducing the intra-articular step to prevent an adverse efficient? e scale (0=extremely unimportant, 10=extremely important at the appropriate position, or enter a numerical rating in the importance of Step int is reducing the intra-articular gap to prevent an adverse patient?	fect on functional e textbox. e effect on function

41. At what surgically?	measurement of displacement of intra-articular step would you intervene
would no	ot intervene (irrespective of the amount of displacement)
I would in	tervene (irrespective of the amount of displacement)
If you would int intervention?	ervene only with a certain amount of displacement, then what would be your threshold of displacement for
(Please answer	r in mm)
42. At what surgically?	measurement of displacement of intra-articular gap would you intervene
would no	ot intervene (irrespective of the amount of displacement)
I would in	tervene (irrespective of the amount of displacement)
If you would int intervention?	ervene only with a certain amount of displacement, then what would be your threshold of displacement for
(Please answei	r in mm)
43. Please e	enter any comments regarding this case not captured above.



Defining displacement thresholds for surgical intervention for distal radius fractures - a Delphi study

Factors affecting Surgical Intervention

This final page asks how important certain factors are, compared to similar demographics.

* 44. When deciding on whether to offer surgical intervention to a patient with a displaced distal radius fracture, how important is the following factor when deciding whether to intervene?

Medical co-morbidities

Please rate on the scale (10=extremely important, 0=extremely unimportant)

Click on the line at the appropriate position, or enter a numerical rating in the textbox.

0	Medical co-morbidities	10	
45. Please enter any additiona	l comments regarding this fac	tor	

* 46. When deciding on	whether to offer surgical intervention to	a patient with a displaced distal
radius fracture, how im	portant is the following factor when dec	iding whether to intervene?
Likely compliance wi	th rehabilitation	
	le (10=extremely important, 0=extreme appropriate position, or enter a numeric	·
0	Likely compliance with rehabilitation	10
47. Please enter any a	dditional comments regarding this facto	r
•	whether to offer surgical intervention to portant is the following factor when dec	·
Age		
	le (10=extremely important, 0=extreme appropriate position, or enter a numeric	• • •
0	Age	10
49. Please enter any a	dditional comments regarding this facto	r

Gender		
	e scale (10=extremely important, 0=extremely t the appropriate position, or enter a numerica	, ,
0	Gender	10
51. Please enter a	any additional comments regarding this factor	
	g on whether to offer surgical intervention to a	•
radius fracture, no	w important is the following factor when decid	ing whether to intervene?
	al capacity affecting the understanding of t	he injury, treatment, and
rehabilitation		
	e scale (10=extremely important, 0=extremely	. ,
	t the appropriate position, or enter a numerica	. ,
		. ,
	t the appropriate position, or enter a numerica Dementia / mental capacity	. ,
Click on the line at	t the appropriate position, or enter a numerica Dementia / mental capacity affecting the understanding of the injury, treatment, and	I rating in the textbox.
Click on the line at	t the appropriate position, or enter a numerica Dementia / mental capacity affecting the understanding of the injury, treatment, and	I rating in the textbox.
Click on the line at	t the appropriate position, or enter a numerica Dementia / mental capacity affecting the understanding of the injury, treatment, and	I rating in the textbox.
Click on the line at	t the appropriate position, or enter a numerical Dementia / mental capacity affecting the understanding of the injury, treatment, and rehabilitation	I rating in the textbox.

* 54. When deciding on whe	ther to offer surgical intervention to	a patient with a displaced distal
radius fracture, how important is the following factor when deciding whether to intervene?		
Pre injury functional stat	us	
Please rate on the scale (10=extremely important, 0=extrem	ely unimportant)
	ropriate position, or enter a numeri	
0	Pre injury functional status	10
EE Dlagge enter any additi	onal comments regarding this factor	or
55. Flease effici any additi	The comments regarding this factor	OI.
* 56 When deciding on who	ther to offer surgical intervention to	a patient with a displaced distal
· ·	ant is the following factor when de	·
radius fracture, now import	and is the following factor when de-	claing whether to intervene?
Occupation		
Occupation		
Diagram water and the cools (f	10	- h
•	10=extremely important, 0=extreme	, ,
Click on the line at the app	ropriate position, or enter a numeri	cal rating in the textbox.
0	Occupation	10
57. Please enter any additi	onal comments regarding this fact	or

* 58. When decidin	ng on whether to offer surgical interve	ntion to a patient with a disp	laced distal
radius fracture, how important is the following factor when deciding whether to intervene?			
Smoking status			
_			
Please rate on the	e scale (10=extremely important, 0=	extremely unimportant)	
	at the appropriate position, or enter a		ıΩΧ
Click off the line t	at the appropriate position, or effect a	Thurnerical rading in the texts	OX.
0	Smoking status	10	
59. Please enter	any additional comments regarding the	nis factor	
* 60. When decidin	ng on whether to offer surgical interve	ntion to a patient with a disp	laced distal
radius fracture, h	ow important is the following factor w	hen deciding whether to inte	ervene?
	•	-	
Alcohol intake			
Please rate on th	e scale (10=extremely important, 0=	extremely unimportant)	
	at the appropriate position, or enter a		inv
Click off the line t	at the appropriate position, or effect a	Thurnerical rading in the texts	OX.
0	Alcohol intake	10	
61. Please enter	any additional comments regarding the	nis factor	

_	whether to offer surgical intervention to portant is the following factor when dec	
Bone fragility (osteop	orosis)	
	e (10=extremely important, 0=extreme appropriate position, or enter a numerio	
0	Bone fragility	10
63. Please enter any ac	dditional comments regarding this facto	or
64. Please enter any acwhether to surgically in	dditional important factors not captured tervene.	l above or comments, regarding



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Many thanks for the time and effort you have put in to complete this survey
The next round will begin in approximately 4 weeks and feedback from the previous round will be provided