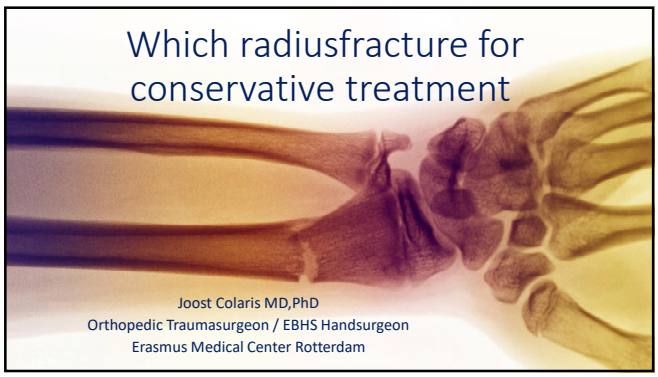
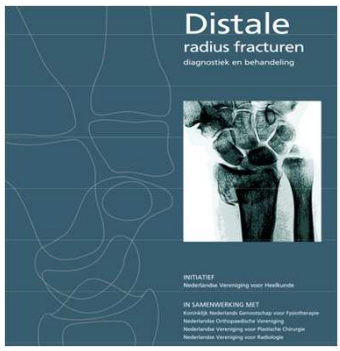
Which radiusfracture for conservative treatment



Joost Colaris MD,PhD
Orthopedic Traumasurgeon / EBHS Handsurgeon
Erasmus Medical Center Rotterdam

1



2

3

4

New guideline

Erasmus MC

5

New literature

Pubmed

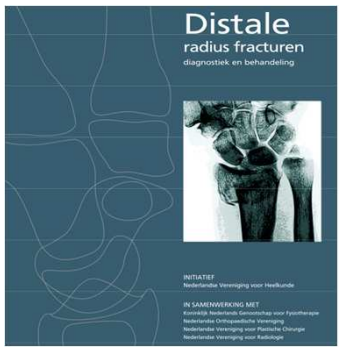
Meta-Analysis / reviews

Treatment of distal radius fractures

Erasmus MC

6

7



8

Level of evidence

FACT

Expert opinion

9

Level of evidence

Grade 1

Grade 2

Grade 3

Grade 4

FACT

Expert opinion

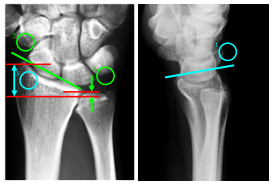
10

Normal anatomy

Erasmus MC

11

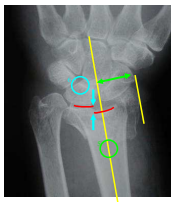
Normal anatomy

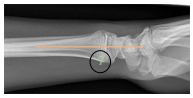


1) Volar tilt
2) Inclination
3) Radial length
4) Ulnar variance

12

Normal anatomy





5) Radial shift
6) Step-off
7) Carpal alignment

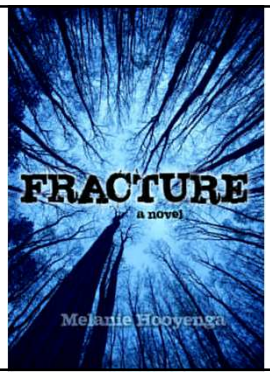
13

Do we need reduction?

Erasmus MC

14

read
the
fracture



15

Criteria for reduction

16

Criteria for reduction

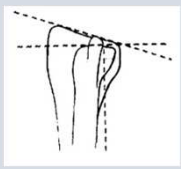
Expert opinion

17

Criteria for reduction

> 15 ° dorsal angulation

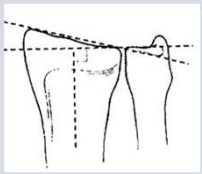
> 20 ° volar angulation



18

Criteria for reduction

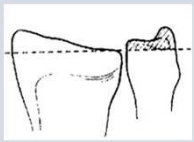
< 15° inclination



19

Criteria for reduction

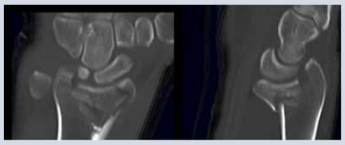
> 5 mm shortening



20

Criteria for reduction

> 2 mm step off



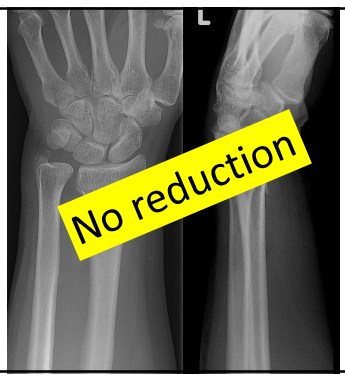
21

Criteria for reduction

Radiocarpal malaligment

22

23



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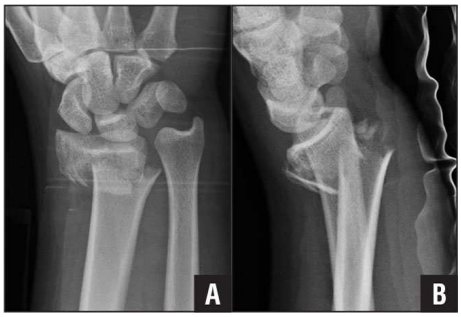

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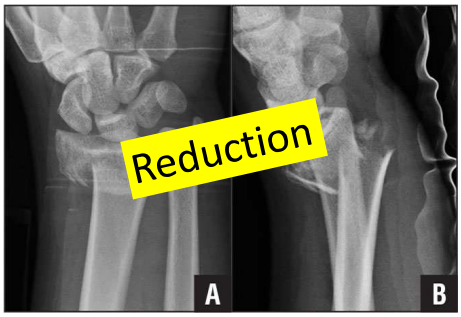


26

27

Instability

Erasmus MC

28

Secondary displacement

trauma

29

Secondary displacement

trauma

after reduction

30

Secondary displacement

trauma | after reduction | after 1 week

31

Instability

Re-displacement chance 57%

Mackenney, 2006

32

33

Criteria for predictable instability

Multifragmentary fracture with severe displacement

Erasmus MC

34

Criteria for predictable instability

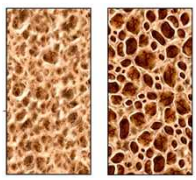
Combined ulna fracture with displacement

Erasmus MC

35

Criteria for predictable instability

Severe osteoporosis



Erasmus MC

36

Criteria for predictable instability

Age > 58 years

Erasmus MC

37

PubMed

38

Instability

Full Length Article

JHS(E)

Predictors of unstable distal radius fractures: a systematic review and meta-analysis

The Journal of Hand Surgery (European Volume) 2016, Vol. 41E(5) 501–515

DOI: 10.1177/1753193415604795
jhs.sagepub.com
SAGE

M. M. J. Walenkamp[1], S. Aydin[1], M. A. M. Mulders[1], J. C. Goslings[1] and N. W. L. Schep[1,2]

Included in meta-analysis N = 8

Erasmus MC

39

Instability

	Random effects model	
	OR	*p*-value
Female vs. male	1.82	<0.00001
Age >60 years vs. <60–65 years	2.67	<0.00001
Dorsal comminution	2.29	<0.00001
Ulnar styloid fracture	1.00	1.00
Intra-articular involvement	0.76	0.53
Dorsal angulation >15°	4.07	0.15
Dorsal angulation >20°	0.92	0.87

OR: odds ratio.

Erasmus MC

40

Instability

	Random effects model	
	OR	*p*-value
Female vs. male	1.82	<0.00001
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Dorsal angulation >15°	4.07	0.15
Dorsal angulation >20°	0.92	0.87

OR: odds ratio.

Erasmus MC

41

Risk factors for instability

Multifragmentary fracture with severe displacement

Combined ulna fracture with displacement

Severe osteoporosis

Age > 58 years

PubMed

Female

Dorsal communition

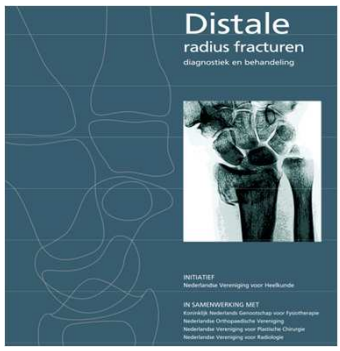
Age > 60 years

42

Pain reduction

Erasmus MC

43



44

Pain reduction

Intravenous Regional Anesthesia (IVRA) > hematoma block

Abbaszadegan,1990
Cobb,1985
Kendall,1997
Walther,1988
Wardrope,1985

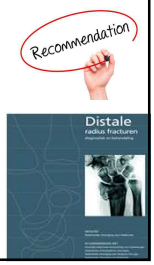
Grade 2

Erasmus MC

45

Pain reduction

Use hematoma block (logistic reasons)

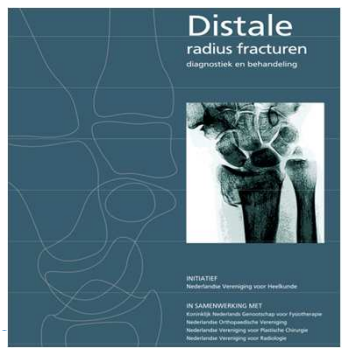


46

Fracture reduction

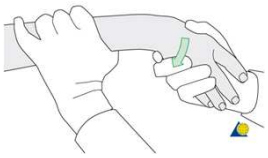
Erasmus MC

47



48

Fracture reduction



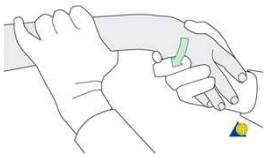
Earnshaw, 2002
Johansson, 1992
Kongsholm, 1987

Grade 2

Erasmus MC

49

Fracture reduction



Earnshaw, 2002
Johansson, 1992
Kongsholm, 1987

Grade 2

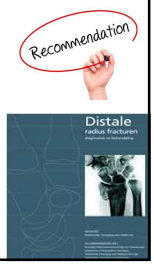
No significant difference in radiological outcome
- After 10 days
- After 12.8 months

Erasmus MC

50

Fracture reduction

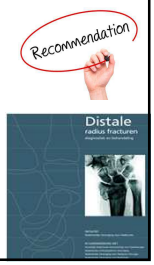
Use the reduction technique you are familiar with



51

Fracture reduction

Also unstable fractures needs reduction

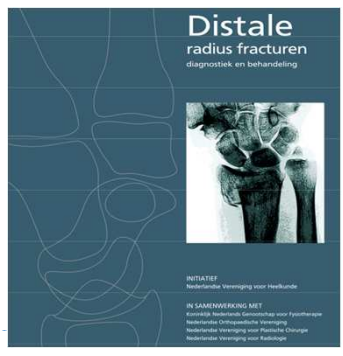


52

Immobilisation

Erasmus MC

53



54

Minimally displaced DRF

Erasmus MC

55

Minimally displaced DRF

Cast

1-3 weeks = 3-5 weeks

Functional outcomes

Christensen, 1995
Jensen, 1997
McAuliffe, 1987
Millet, 1995
Stoffelen, 1998
Vang Hansen, 1998

Grade 2

Erasmus MC

56

Minimally displaced DRF

Cast versus brace

Comparable results in pain & function

Abbaszadegan, 1989
Davis, 1987
O'Connor, 2003
Tumia 2003

Grade 2

Erasmus MC

57

Displaced DRF

Erasmus MC

58

Displaced DRF

Cast versus brace

Less pain in cast

Moir, 1995
Tumia, 2003

Grade 2

Erasmus MC

59

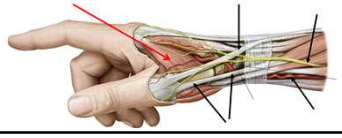
Displaced DRF

Cast versus brace

Less complications of the radial sensory nerve in cast

Ledingham, 1991
Moir, 1995

Grade 2



Erasmus MC

60

Displaced DRF

Immobilisation of elbow

Bong, 2006
Jackson, 2001
Sørensen, 1986

Comparable anatomical and functional results

Grade 2

Erasmus MC

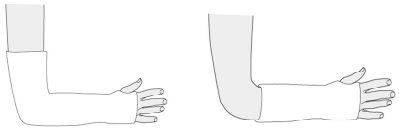
61

Displaced DRF

Below-elbow cast versus above-elbow cast

Bong, 2006

Comparable results



Grade 3

Erasmus MC

62

DRF

Erasmus MC

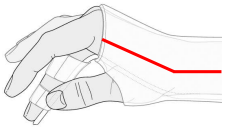
63

DRF

Cast

Gupta, 1991

Wrist in extension ⟶ better functional results



Grade 3

Erasmus MC

64

Immobilisation

cast or brace
1-3 weeks

65

Immobilisation

cast 4-5 weeks
wrist in extension

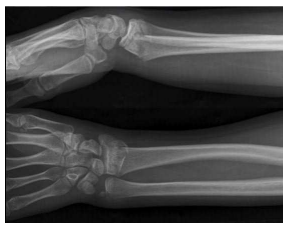
66

Emergency department

Erasmus MC

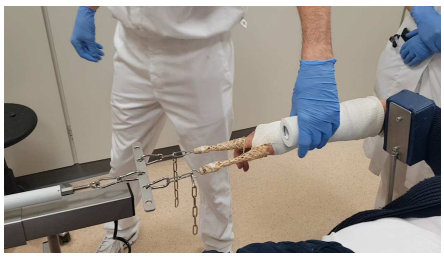
67

Displaced DRF



68

Reduction



Erasmus MC

69

Splint or circumferential cast?

Erasmus MC

70

Secondary displacement

trauma

after reduction

after 1 week

71

Retrospective research

556 patients with a reduced DRF

15%

Fracture re-displacement < 1 week

23%

Erasmus MC

72

ZonMw

Subsidies | Onderzoek & resultaten | Actueel

Project

How should we treat a patient with a distal radius fracture after closed reduction? A cluster RCT

73

ZonMw

Subsidies | Onderzoek & resultaten | Actueel

Project

How should we treat a patient with a distal radius fracture after closed reduction? A cluster RCT

CAST study

74

TRIAL

10 hopitals

560 patients

Randomisation

75

TRIAL

10 hopitals

560 patients

Randomisation

Primary outcome

Re-displacement fracture

76

TRIAL

10 hopitals

560 patients

Randomisation

Primary outcome

Re-displacement fracture

Secundairy outcomes

surgery, complications, function, costs

77

CRPS

78

79

CRPS

500 mg Vitamin C
50 days

Less chance to develop CRPS

Zollinger, 1999
Zollinger, 2007
Cazeneuve, 2002

Grade 1

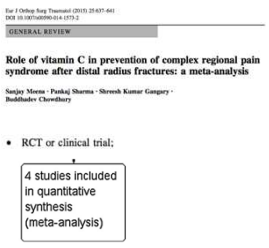
Erasmus MC

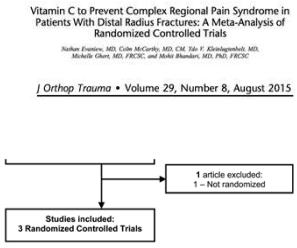
80

PubMed

81

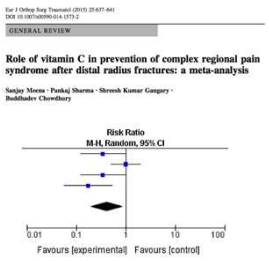
CRPS

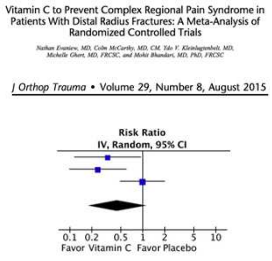




82

CRPS





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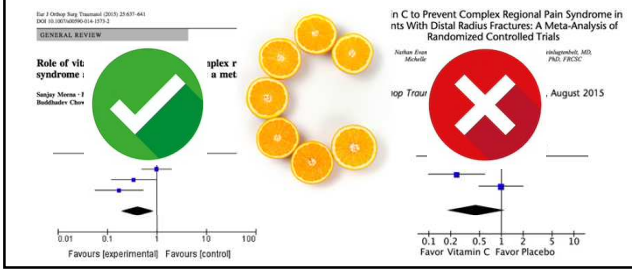
CRPS



84

Too much Vitamin C

Erasmus MC

85

Manneke pis

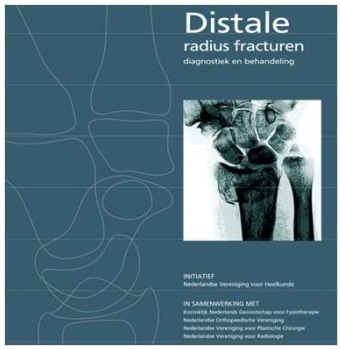
Erasmus MC

86

Aftertreatment

Erasmus MC

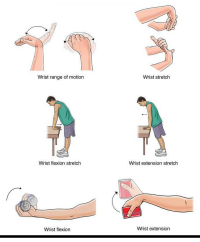
87



88

Physiotherapy

No added value for physiotherapy instead of exercise instructions



Bache, 2001
Kay, 2000
Maciel, 2005
Pasila, 1974
Wakefield, 2000

Grade 2

Erasmus MC

89

Physiotherapy

No advantage of any type of physiotherapy

Handoll, 2006
Kay, 2008

Grade 2

Erasmus MC

90

Physiotherapy

No advantage of early mobilisation

Allain, 1999;
Lozano-Calderon, 2008;
McQueen, 1996

Grade 2

Erasmus MC

91

PubMed

92

Physiotherapy

Cochrane Library
Cochrane Database of Systematic Reviews

Rehabilitation for distal radial fractures in adults (Review)

Handoll HHG, Elliott J

Erasmus MC

93

Physiotherapy

26 trials
1269 patients

Not enough evidence available to determine the best form of rehabilitation for people with wrist fractures.

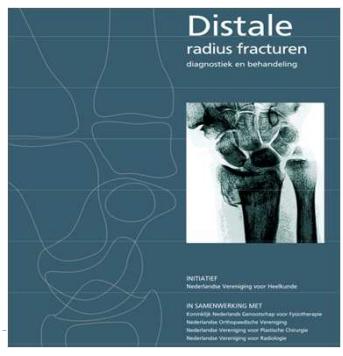
Erasmus MC

94

Treatment protocol

Erasmus MC

95



96

Flowchart

Low energy trauma

Erasmus MC

97

Flowchart

Low energy trauma

Non-displaced --> cast/brace 3 weeks

Erasmus MC

98

Flowchart

Low energy trauma

Non-displaced --> cast/brace 3 weeks

Displaced --> reduction

Erasmus MC

99

Flowchart

Low energy trauma

Non-displaced --> cast/brace 3 weeks

Displaced --> reduction

Intra-articular

CT - scan

Erasmus MC

100

Flowchart

Low energy trauma

Non-displaced --> cast/brace 3 weeks

Displaced --> reduction

Extra-articular

Intra-articular

CT - scan

Erasmus MC

101

Flowchart

Low energy trauma

Non-displaced --> cast/brace 3 weeks

Displaced --> reduction

Extra-articular

Intra-articular

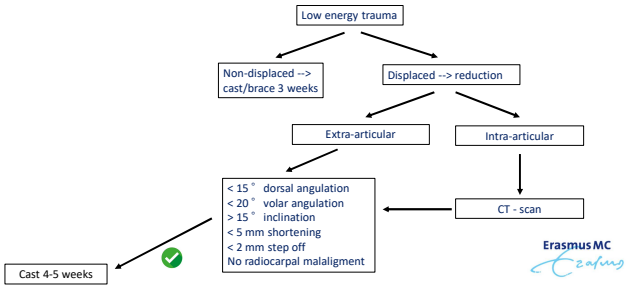
< 15 ° dorsal angulation
< 20 ° volar angulation
> 15 ° inclination
< 5 mm shortening
< 2 mm step off
No radiocarpal malaligment

CT - scan

Erasmus MC

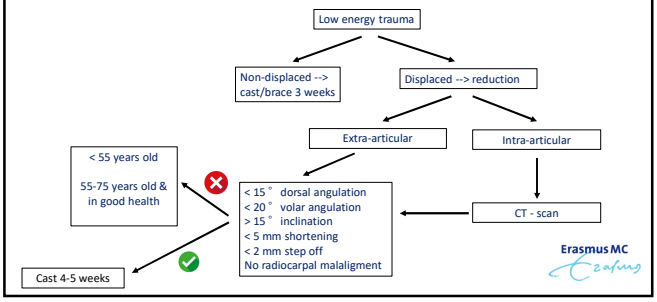
102

Flowchart



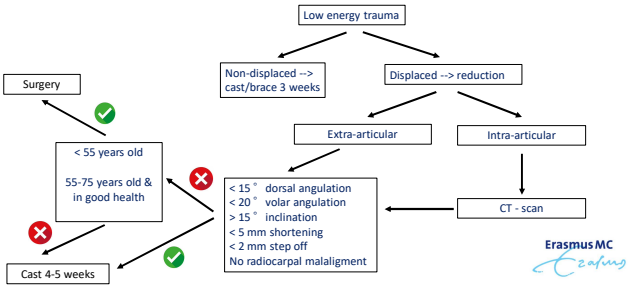
103

Flowchart



104

Flowchart



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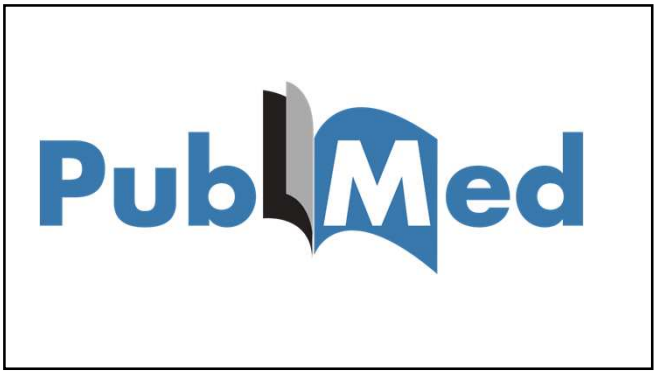


106

Literature 1, 2016

Safety and Efficacy of Operative Versus Nonsurgical Management of Distal Radius Fractures in Elderly Patients: A Systematic Review and Meta-analysis

Yiheng Chen, MD,* Xinglong Chen, MD,* Zhijie Li, MD,* Hede Yan, MD, PhD,* Feiya Zhou, MD,* Weiyang Gao, MD*

J Hand Surg Am. • Vol. 41, March 2016

8 studies

858 patients, >60 years

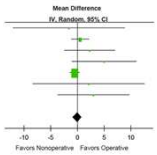
Minimum follow-up 12 months

Erasmus MC

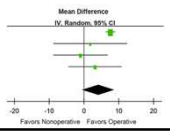
107

Literature 1, 2016

DASH



PRWE



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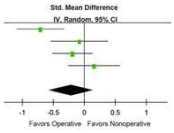
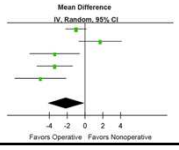
108

Literature 1, 2016

VAS pain



Grip strength



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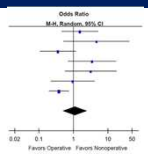
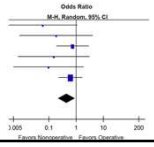
109

Literature 1, 2016

Minor complications



Major complications



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Literature 1, 2016

Surgery does not provide better clinical outcomes for elderly patients.

Surgery offer

- Better radiographic outcomes and grip strength
- Higher risk of complications

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Literature 2, 2015

Langenbecks Arch Surg (2015) 400:767–779
DOI 10.1007/s00423-015-1324-9

SYSTEMATIC REVIEW AND META-ANALYSIS

Comparison of treatment outcomes between nonsurgical and surgical treatment of distal radius fracture in elderly: a systematic review and meta-analysis

Ji-Hui Ju[1] · Guang-Zhe Jin[1] · Guan-Xing Li[1] · Hai-Yang Hu[1] · Rui-Xing Hou[1]

Surgical and nonsurgical methods produce similar results
Better radiographic outcomes with surgery.

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112

Literature 3, 2018

Association Between Radiological and Patient-Reported Outcome in Adults With a Displaced Distal Radius Fracture: A Systematic Review and Meta-Analysis

Marjolein A. M. Mulders, MD, PhD,* Robin Detering, MD,* Daniel A. Rikli, MD,§ Melvin P. Rosenwasser, MD,† J. Carel Goslings, MD, PhD,* Niels W. L. Schep, MD, PhD‡

J Hand Surg Am. • Vol. 43, August 2018

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113

Literature 3, 2018

Studies that evaluated the association between radiological outcome and patient-reported outcome measures

Follow- up of at least 12 months

16 studies with a total of 1,961 patients

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Literature 3, 2018

Malalignment associated with worse patient-reported outcomes.

But not clinically important.

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Take home message

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116

Instability

Multifragmentary fracture with severe displacement

Combined ulna fracture with displacement

Severe osteoporosis

Age > 58 years

PubMed

Female

Dorsal communition

Age > 60 years

117

Pain reduction

Use hematoma block (logistic reasons)

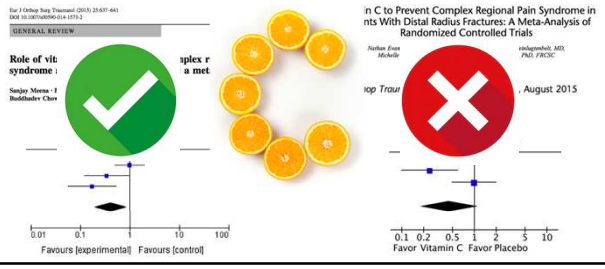
118

Fracture reduction

Use the reduction technique you are familiar with

119

Use Vitamin C to prevent CRPS



120

Physiotherapy

No advantage of any type of physiotherapy

Handoll, 2006
Kay, 2008

Grade 2

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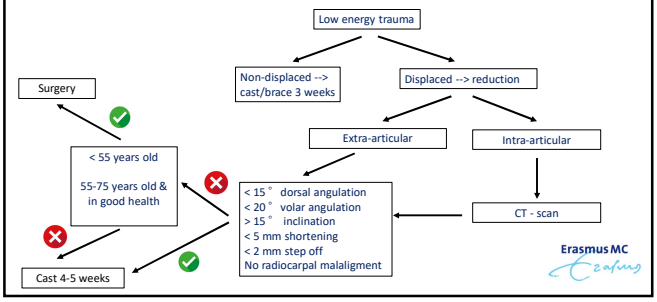
121

Flowchart



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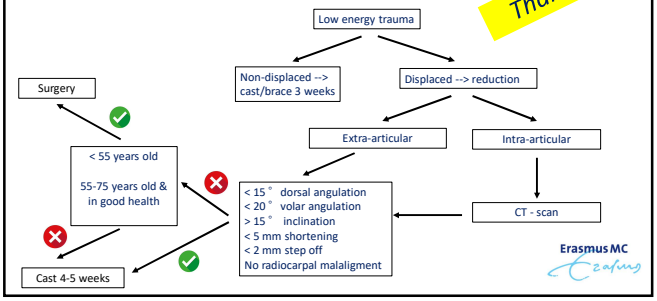
122

Flowchart

Thank you



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123