

# Complications after osteosynthesis of distal radius fractures using a volar locking plate.

AO advanced 2022 Fredericia

# Disclosure:

## No potential conflicts of interest

Faculty: Frank Damborg.

Consultant. Kolding hospital. Denmark.

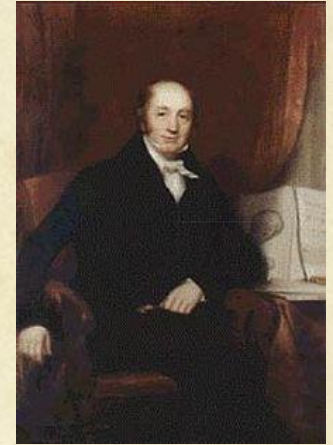
I have no financial relationships with commercial entities that produce health-care related products.



# Learning objectives

- Komplikationsrater
- Komplikationer
- Kan de undgås?
- Mindskes?
- Minimeres?

# Complications after osteosynthesis of distal radius fractures using a volar locking plate.



Dr. Colles

[Dan Med J.](#) 2014 Oct;61(10):A4906. High rate of complications following volar plating of distal radius fractures.  
[Knudsen R](#), [Bahadirov Z](#), [Damborg F](#).



# Back Ground:

Last years: High increase of osteosynthesis of dislocated distal radius fracture (ODDRF).

Several studies show good result regarding ROM, position of bone.....

Incident of complications is not as well documented.

# Purpose:

- 1) To document the incident and type of complications following Osteosynthesis of Dislocated Distal Radius Fractures (ODDRF).
- 2) Compare results using LCP (Synthes) and DVR (Depuy)



LCP



DVR



# Method and Material:

All adult patients (2008 and 2009)

Kolding hospital

Dislocated closed distal Radius fractures\*

Using a volar locking plate (LCP or DVR)



*: Dorsal angulation	> 12 degrees
Shortening of radius	> 2 mm
Inclination of radius	< 10 degrees
Joint gap/step	> 2 mm

# Definition of complications:

Postoperative carpal tunnel syndrome\*.

Tendon irritation/rupture\*

Insufficient osteosynthesis\*

Reduced ROM of wrist\*

Infection\*

Complex regional pain syndrome

Skin healing problems (> 4 weeks post -op)



\*: Which required re-operation.



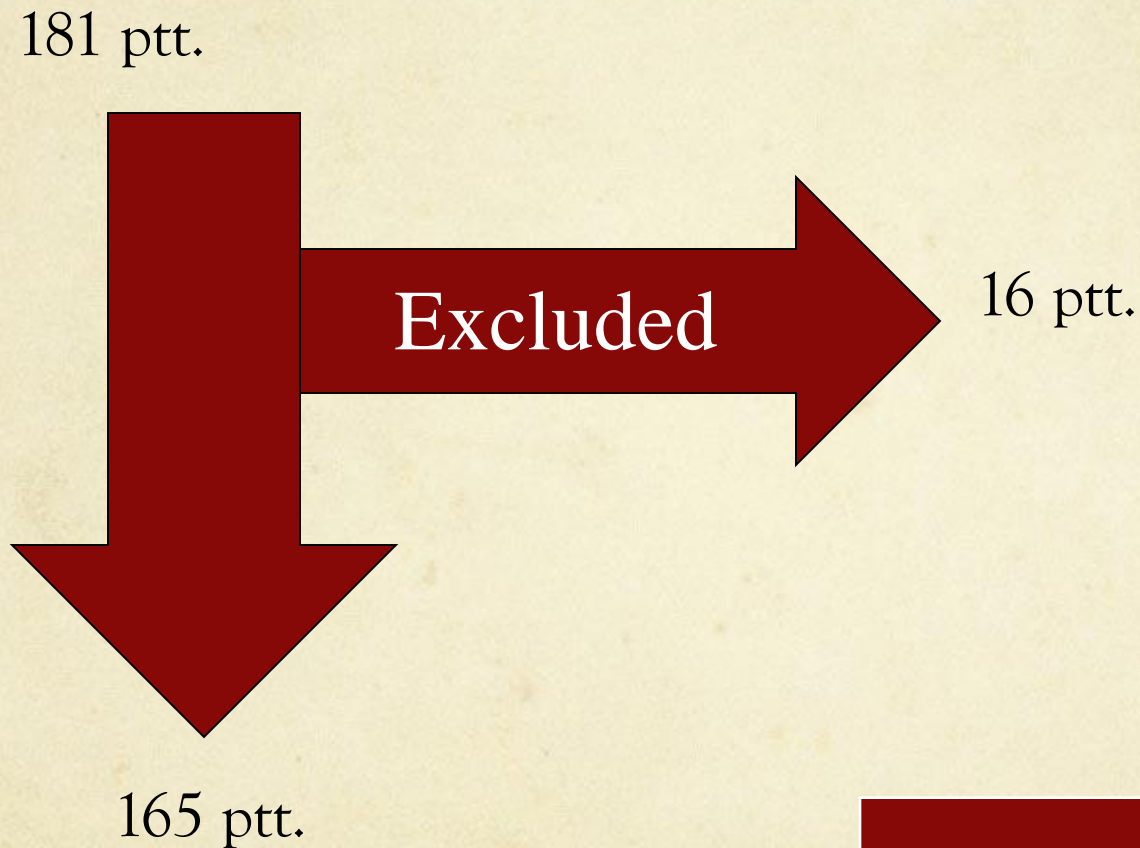
# Method

Retrospective study:

- Patients notes
- X-rays



# Method and Material



Gender: 33 men and 132 women  
Age: Avenge: 61 years (19-85)



# Results

39 complications:

Number of patients with complications:

30 ptt. / 165 ptt. ➔

18 % had at least one complication



# Complications:

Complications	Number	Type of Plate	
		LCP n=63	DVR n=102
Carpal tunnel syndrome*	12	5	7
Tendon irritation/rupture*	9	6	3
Insufficient osteosynthesis*	12	5	7
Reduced ROM*	1	1	0
Infection*	2	1	1
Complex regional pain syndrome	2	1	1
Skin healing problems**	1	1	0
Total number	39	20	19

\*: Which required re-operation

\*\*> 4 weeks post-operative.



# Results

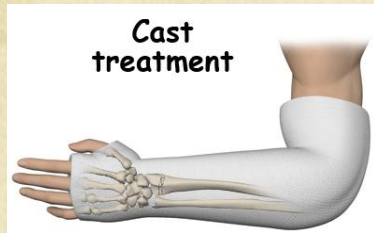
Kind of volar locking plate	% of patients experiencing complications
LCP (63 ptt.)	24% ( = 15 ptt. / 63 ptt.)*
DVR (102 ptt.)	14% (15 ptt. / 102 ptt )*

\*:  $P = 0,054$  ved Chi2 test.

# Conclusion/discussion

30 ptt. / 165 ptt. (18 %) had at least one complication.

Other studies:



Study		No. of Complications	
Rozenal et al. (2006)		22%	(LCP and DVR)
Arora et al. (2007)		27%	(LCP)
Ward et al. (2010)		23%	(DVR)

***“This incident of complications must be taken into consideration, when choosing between conservative or operative treatment”***



I 2008-9!



# Konsekvens i afd:

- Samlet på færre hænder
- Ikke u-superviseret indgreb
- Ophørt med LCP
- Herefter kun DVR + VA2 (Efter licitation)
- Studie gentaget på pt fra 2013+14



# Complications following distal radius fracture osteosynthesis with two different volar locking plates: VA2 versus DVR

Julie Ladeby Erichsen<sup>1</sup>, Roland Knudsen<sup>2</sup>, Zafar Bahadirov<sup>1</sup> & Frank Damborg<sup>1</sup>

## Background

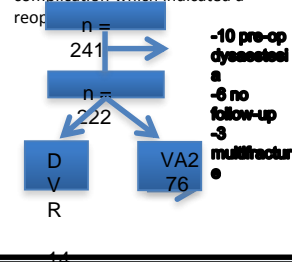
Open Reduction and Internal Fixation (ORIF) of distal radius fractures using a volar locking plate, has become one of the most common operations performed. However, to date, there is a limited amount of literature describing the complications following this procedure.

## Aim

- Investigate the complications leading to reoperation after ORIF of distal radius fractures using two different volar locking plates.
- Difference in complications and complication rate between VA2\* and DVR\*.

## Method

A retrospective Cohorte Study. We included 222 patients with a distal radius fracture which had been operated on with ORIF using one of the two volar locking plates, VA2, (synthes) or DVR (biomed), at Kolding Hospital in the period January 1. 2013 to July 1. 2014. Using patients journals and x-rays, we registered any complication which indicated a reoperation.



## Limitations

- Number of study cohort
- Follow-up periode 6 months, too short?

## Results

Complications	Fracture type					
	23A n=98		23B n=19		23C n=105	
	DVR n=54	VA2 n=44	DVR n=12	VA2 n=7	DVR n=80	VA2 n=25
<b>Total number</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>9</b>	<b>8</b>
CTS*	2	3	2	0	7	3
Tendon rupture	0	0	0	0	2	1
Insuff. ORIF	0	1	0	0	0	3
Reduced ROM*	2	0	1	0	0	1
Infection	0	0	0	0	0	0
CRPS*	0	0	0	0	0	0
Wound healing sequelae	0	0	0	0	0	0

- 28/222 (12,6%) patients experienced a complication which needed a second operative intervention.
- There were no statistical differences in complication rates when operated on using either VA2 or DVR (DVR 16/146 vs VA2 12/76, Chi2, *p*-value: 0.671).

## Conclusion

- We registered 12.6% complicationrate, which needed a reoperation.
- There was no statistic difference in complicationrate when using either a VA2 or DVR, although there was a tendency towards more frequent complications after more complex fractures in both groups.
- CTS was the most frequent complication leading to reoperation.

DVR: Distal Volar Radius plate (Biomed)  
 VA2: Variable angle two column plate (synthes)  
 ROM: Range of Movement  
 CRPS: Complex Regional Pain Syndrome  
 CTS: Carpal Tunnel Release

## Affiliations

<sup>1</sup> Department of Orthopaedic Surgery, Kolding St B

For more information please  
 contact: Name: Julie Ladeby  
 Erichsen  
 E-mailadress:  
 julie.ladeby.erichsen@rsyd.dk



Department of  
Orthopaedic Surgery

Kolding Hospital  
- part of Lillebaelt Hospital

# Complications following distal radius fracture osteosynthesis with two different volar locking plates: VA2 versus DVR

Julie Ladeby Erichsen<sup>1</sup>, Roland Knudsen<sup>2</sup>, Zafar Bahadirov<sup>1</sup> & Frank Damborg<sup>1</sup>

## Background

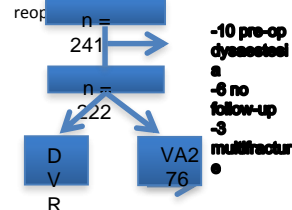
Open Reduction and Internal Fixation (ORIF) of distal radius fractures using a volar locking plate, has become one of the most common operations performed. However, to date, there is a limited amount of literature describing the complications following this procedure.

## Aim

1. Investigate the complications leading to reoperation after ORIF of distal radius fractures using two different volar locking plates.
1. Difference in complications and complication rate between VA2\* and DVR\*.

## Method

A retrospective Cohorte Study. We included 222 patients with a distal radius fracture which had been operated on with ORIF using one of the two volar locking plates, VA2, (synthes) or DVR (biomed), at Kolding Hospital in the period January 1. 2013 to July 1. 2014. Using patients journals and x-rays, we registered any complication which indicated a reoperation.



## Limitations

- Number of study cohort
- Follow-up periode 6 months, too short?

## Results

Complications	Fracture type					
	23A n=98		23B n=19		23C n=105	
	DVR n=54	VA2 n=44	DVR n=12	VA2 n=7	DVR n=80	VA2 n=25
<b>Total number</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>9</b>	<b>8</b>
CTS*	2	3	2	0	7	3
Tendon rupture	0	0	0	0	2	1
Insuff. ORIF	0	1	0	0	0	3
Reduced ROM*	2	0	1	0	0	1
Infection	0	0	0	0	0	0
CRPS*	0	0	0	0	0	0
Wound healing sequelae	0	0	0	0	0	0

- 28/222 (12,6%) patients experienced a complication which needed a second operative intervention.
- There were no statistical differences in complication rates when operated on using either VA2 or DVR (DVR 16/146 vs VA2 12/76, Chi2 , *p*-value: 0.671).

## Conclusion

- We registered 12.6% complicationrate, which needed a reoperation.
- There was no statistic difference in complicationrate when using either a VA2 or DVR, although there was a tendency towards more frequent complications after more complex fractures in both groups.
- CTS was the most frequent complication leading to reoperation.

DVR: Distal Volar Radius plate (Biomed)  
 VA2: Variable angle two column plate (synthes)  
 ROM: Range of Movement  
 CRPS: Complex Regional Pain Syndrome  
 CTS: Carpal Tunnel Release

## Affiliations

<sup>1</sup> Department of Orthopaedic Surgery, Kolding St B

For more information please  
 contact: Name: Julie Ladeby  
 Erichsen  
 E-mailadress:  
 julie.ladeby.erichsen@rsyd.dk



Department of  
 Orthopaedic Surgery

Kolding Hospital  
 - part of Lillebaelt Hospital



# Konklusion:

- Komplikationsraten i litteraturen er 8-27 %
- Efter 5 års "arbejde" nedbragte vi vores:
- fra 18 til 12 %
- Planlægger igen at opgøre
- OBS disse re-operationsrater når indikation for OP stilles!!

# Konklusion:

- Følg guidelines
- Konservativ når muligt
- Kend dit implantat
- Brug "låseskinner"
- Tal ALTID med pt + undersøg før OP.
- Identificer truende CTS præoperativt > Spalt i 2 incisioner.



Slut!

Herefter extra baggrund til 1. præsentation:



# Complications:

Complications	Number	Type of Plate	
		LCP n=63	DVR n=102
Carpal tunnel syndrome*	12	5	7
Tendon irritation/rupture*	9	6	3
Insufficient osteosynthesis*	12	5	7
Reduced ROM*	1	1	0
Infection*	2	1	1
Complex regional pain syndrome	2	1	1
Skin healing problems**	1	1	0
Total number	39	20	19

\*: Which required re-operation

\*\*> 4 weeks post-operative.

# Excluded

Central / peripheral neuropathy

Open fractures

Additional fractures to same arm

Loss at follow up



Komplikation	Frakturtype					
	23A n=78		23B n=12		23C n=75	
	LCP n=41	DVR n=37	LCP n=7	DVR n=5	LCP n=15	DVR n=60
<b>Total antal komplikationer</b>	<b>12</b>	<b>6</b>	<b>5</b>	<b>0</b>	<b>3</b>	<b>13</b>
Karpaltunnel syndrom	5	2	0	0	0	5
Seneirritation/ruptur	2	1	2	0	2	2
Insufficient osteosyntese	2	2	2	0	1	5
Nedsat bevægelighed	1	0	0	0	0	0
Infektion	1	0	0	0	0	1
Sympatisk refleksdystrofi	0	1	1	0	0	0
Sårhelingsproblemer	1	0	0	0	0	0

# Insufficient osteosynthesis:

- 1) Unstable: Sec. Collapse\*
- 2) Missed placed screws ect.\*
- 3) Unacceptable position at post-operative X-ray\*

\*: which resulted in re-operation.



# Results

Fracture type: 23B 1+2+3	+ Complication	- Complikation
LCP n=7	5	2
DVR n=5	0	5

Chi2:  $p = 0,013$