Abstracts nvvh 20 mei:

1) **Postoperative dorsal PIP joint subluxation in volar base middle phalangeal fractures**

**K Oflazoglu, SC Wilkens, H Rakhorst, KR Eberlin, D Ring, NC Chen**

Aim: The purpose was to study the rate of and risk factors for postoperative dorsal subluxation in volar middle phalanx base fractures. The second purpose was to study the association between postoperative dorsal subluxation with postoperative arthritis.

Methods: We identified 47 surgically treated volar base PIP joint fractures with available pre- and post-operative radiographs between 2002 and 2015 at 2 academic medical systems. Demographic, injury, radiographic, and treatment data that might be associated with postoperative dorsal subluxation were collected. Three hand surgeons independently assessed subluxation and arthritis on radiographs. Factors identified during bivariate analysis with a P<0.10 were entered into a multivariable logistic regression analysis.

Results: Seven of 47 fingers (15%) had postoperative dorsal subluxation after initial surgery. Comminution and the amount of articular involvement were not independently associated with postoperative dorsal subluxation of the PIP joint. Twelve of 47 patients (26%) had postoperative arthritis; 4 of 12 arthritic joints had postoperative subluxation. No significant association was found between postoperative dorsal subluxation with postoperative arthritis (P=0.06).

Discussion: Comminuted fracture fragments interact with the amount of articular involvement and seem to be associated with postoperative subluxation. The association of persistent subluxation and early arthrosis in dorsal PIP joint fracture dislocations needs further study. At this time it is unclear in what ways persistent subluxation or arthrosis affects the rate of reoperation.

2) **A Systematic Review and meta-analysis of Arthroscopy for the Treatment of Thumb Carpometacarpal Joint Osteoarthritis**

**SC Wilkens, CA Bargon, A Mohamadi, N Chen, HJ Coert**

Hypothesis: Arthroscopic management is a relatively new technique and has gained popularity as a potential treatment option for mild thumb carpometacarpal (CMC) osteoarthritis (OA). We performed a systematic review of arthroscopy for the treatment of thumb CMC OA and a meta-analysis of Visual Analog pain Scores (VAS), Disability of Arm, Shoulder and Hand (DASH) scores, grip strength, and pinch strength before and after arthroscopy for the treatment for thumb CMC OA.
Methods: We performed a systematic search in 3 electronic databases until May 2016 for studies describing arthroscopy for treatment of thumb CMC OA. Study characteristics were extracted and meta-analyses of VAS, DASH scores, grip strength, and pinch strength before and after arthroscopy were performed for the 10 included nonrandomized cohort studies including 294 patients. The pooled Hedge’s g was calculated for each outcome and then classified as either a trivial small, medium, or large effect. We also performed a subgroup analysis comparing the various surgical procedures used among the included articles. One group of matched controls was compared to the arthroscopic techniques in a secondary subgroup analysis. The number needed to treat (NNT) was thereafter approximated using the Furukawa and Kraemer method.

Results: About 64-100% of patients were satisfied with arthroscopy and all patients were able to return to work. The overall combined complication rate was low (4%). Most studies did not report the rate of secondary surgery. This meta-analysis found a large effect on VAS and DASH scores and a small effect on grip strength. There was no effect on pinch strength. The NNT was 1.5 for improvement of the VAS, indicating that for each 2 patients treated arthroscopically, 1 will experience improvement (VAS below 3.4) of the preoperative pain. The NNT was 1.2 for DASH and 5.8 for grip strength.

Conclusion: Current evidence suggests that arthroscopy for CMC OA may improve pain scores and patient validated outcomes and seems to be a reasonable option for patients with mild thumb CMC OA who do not respond to non-operative treatment. However, it is debatable if it might be useful in more advanced stages of CMC OA and unclear whether these outcomes are durable.

3) **Scaphoid nonunion interfragmentary motion patterns, by 4-dimensional computed tomographic imaging**

   **MGA de Roo, MD1,2; JGG Dobbe , GJ Streekstra, SD Strackee**

The scaphoid fracture is the most common carpal fracture and is notorious for problems with healing. When healing of the fracture fails, a so-called scaphoid nonunion, a specific pattern of osteoarthritis occurs, including pain, restricted wrist motion and carpal instability. The kinematical effects of a scaphoid nonunion on the remainder of the wrist are poorly understood.
Currently, only two studies evaluated scaphoid nonunion motion patterns using three-dimensional imaging of the wrist in multiple static positions. However, static imaging modalities cannot evaluate abrupt dynamic changes in wrist kinematics. Visualizing and quantifying scaphoid fragment motion patterns requires an imaging technique that can acquire and analyse wrist motion in three-dimensional space over time. To this end we used a dynamic three-dimensional (e.g. four-dimensional) CT imaging technique to assess the kinematical motion patterns of a scaphoid nonunion.

We evaluated the interfragmentary motion patterns of the scaphoid bone fragments. We specifically test the hypothesis that the kinematical motion pattern is related to the position of the fracture line with respect to the scaphoid apex. In this trial we aim to include 20 patients with a scaphoid nonunion.

Until now we included four patients with a one-sided scaphoid nonunion. Both wrists were scanned in neutral position with a regular dose CT scanner. Dynamic four-dimensional CT images were acquired during flexion-extension and radio-ulnar deviation of the wrists. We found different interfragmentary motion patterns between patients during wrist flexion and ulnar deviation.

Dynamic imaging of joints is a new and promising trend, creating opportunities to quantitatively evaluate normal and pathological wrist kinematics. We expect that more patients will be included and analyzed before the NVvH spring congress.

4) **Plate removal following distal radius fracture surgery is related to Soong grading.**

CA Selles, STH Reerds, G Roukema, CH van der Vlies, BI Cleffken, NWL Schep

Abstract

Introduction:
Plate fixation is an accepted method in distal radius fracture treatment offering biomechanically stable fixation and thus allowing for early rehabilitation. Incidence for plate removal ranges with a reported incidence between 3-10%. Volar plate position can be classified according to Soong. This is a classification that determines implant prominence at the watershed line of the distal part of the radius. It is suggested that a higher Soong classification is related to flexor tendinitis and tendon rupture. The primary aim of this study is to determine the relationship between volar plate removal and the Soong classification. We hypothesize that a higher Soong grade will be associated with plate-related complaints and thus be more common in the group of patients where plate removal has taken place.

Secondary outcome measures are incidence and indications for plate removal, including dorsal and combined volar and dorsal plates following distal radius fracture treatment.

Methods:
In this retrospective cohort study, all consecutive patients who had volar, dorsal or combined plate fixation for a distal radius fracture in 2011-2015 were reviewed. Patients were excluded if they underwent an alternate form of fixation, had less than one year of follow-up, or could not be reached for follow-up. Soong grade was examined on postoperative radiographs of all patients who had volar plate fixation. Plates that do not extend volar to the critical line are recorded as Grade 0. Plates volar to the line but proximal to the rim are recorded as Grade 1. Plates directly on or beyond the rim are recorded as Grade 2. Differences in Soong
classification between patients who had plate removal and those who did not have plate removal were analyzed. Additionally, the total incidence and indications for plate removal was calculated.

Results:
A total of 342 patients were included. Soong classification was significantly higher in patients who had plate removal compared to those who did not (p<0.001). For patients with plate placement classified as Soong grade 2 the risk of plate removal is approximately six times higher than those classified as Soong 0 (Table). The incidence of plate removal in all patients was 17.5%. In patients with volar plating, dorsal plating and double plating the incidence was 16.4%, 37.5% and 21.4% respectively. Indications for plate removal were: pain (65%), stiffness (13.3%), malpositioned screws (5%), carpal tunnel syndrome (5%), corrective osteotomy (3.3%), extensor tendon irritation (3.3%), and extensor tendon rupture (3.3%). Patients who had plate removal were 10.2 years younger compared with patients with the plate in situ (p<0.001). At one year following plate removal, 85% of patients had no more complaints.

Conclusion:
Soong grading is higher in patients who have undergone plate removal. This stresses the importance of accurate plate positioning. The total incidence of plate removal after distal radius fractures is 17.5%. In patients with volar plating, dorsal plating, and double plating the incidence was 16.4%, 37.5%, and 21.4% respectively.

Table: Odds ratio of variables in regression analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratio</th>
<th>p-value, (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.96</td>
<td>0.001 (0.94-0.98)</td>
</tr>
<tr>
<td>Gender</td>
<td>1.02</td>
<td>0.957 (0.47-2.24)</td>
</tr>
<tr>
<td>Soong grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 0</td>
<td>(ref)</td>
<td></td>
</tr>
<tr>
<td>Grade 1</td>
<td>1.46</td>
<td>0.385 (0.62-3.43)</td>
</tr>
<tr>
<td>Grade 2</td>
<td>6.68</td>
<td>&lt;0.001 (2.74-16.24)</td>
</tr>
</tbody>
</table>

5) Diagnostic accuracy of 1.5T and 3.0T MRI and MR-arthrography in detecting TFCC lesions of the wrist.
BC Boer, M Vesterling, SM van Raak, EO van Kooten, R Huis in ’t Veld, A JH Vochteloo

Introduction
In case of clinical suspicion of triangular fibrocartilage complex (TFCC) injury, different imaging techniques are used for further evaluation. The gold standard diagnostic investigation is arthroscopy, however this is an invasive procedure. Due to the lack of evidence regarding the superiority of sensitivity and specificity, both MRI and MRI-arthrography (MRA) are used for diagnosis of TFCC injuries. Furthermore it is unknown whether 3T MRI has better diagnostic accuracy compared to 1.5T MRI. The aim of this study was to evaluate diagnostic accuracy, sensitivity
and specificity of 1.5 T and 3.0T conventional MRI and MRI-arthrography (MRA) for the detection of TFCC tears, with arthroscopy as gold standard

Methods
Between January 2009 to May 2016, 304 patients who presented with ulnar-sided wrist pain underwent an arthroscopy due to suspicion of TFCC injury. Of this cohort, 203 patients underwent preoperative MRI of MRA. 53 patients were excluded from the study due to MRI or MRA <1.5T, new trauma between MRI and arthroscopy; TFCC repair or nettoyage in the past; interval between MRI or MRA and arthroscopy >six months; systemic disease (i.e. gout or rheumatoid arthritis). The remaining 150 patients were retrospectively evaluated and compared to findings at arthroscopy. Sensitivity, specificity and accuracy for detection of TFCC tears compared with arthroscopy were calculated for preoperative conventional 1.5T (n=15) and 3.0T (n=105) MRI and 1.5T (n=12) and 3.0T (n=18) MRA.

Results
A tear of the TFCC was identified in 99 of 150 patients during arthroscopy. Arthroscopy being the gold standard, 1.5T wrist MRI had a sensitivity of 71%, a specificity of 75% and an accuracy of 73%. 3.0T wrist MRI had a sensitivity of 73%, a specificity of 67%, and an accuracy of 70%. 1.5T wrist MRA had a sensitivity of 80%, specificity of 100% and an accuracy of 90%. 3.0T wrist MRA had a sensitivity of 73%, a specificity of 100% and an accuracy of 86%.

Conclusion
The diagnostic accuracy of MRA was slightly superior to MRI. However, one could question whether this difference in diagnostic accuracy outweighs the burden and risks of an invasive procedure for patients and its additional costs. Results of the current study could not confirm the superiority of 3T MRI compared to 1.5T in contrast to limited current evidence.

6) Predictors of Patient Satisfaction with Hand Function after Fasciectomy for Dupuytren's Contracture.

C Zhou, SE Hovius, HP Slijper, MJ Zuidam, X Smit, R Feitz, RW Selles

BACKGROUND:
This study examined patient satisfaction with hand function after fasciectomy for Dupuytren's contracture and determined which preoperative patient- and disease-specific factors predicted this satisfaction.

METHODS:
Demographics and disease-specific factors were assessed from a prospective cohort of 194 patients who completed the Michigan Hand Outcomes Questionnaire preoperatively and underwent limited fasciectomy between 2011 and 2014 at six hand surgery practice sites. To evaluate satisfaction with hand function, patients were asked to complete the Michigan Hand Outcomes Questionnaire during the first year after fasciectomy. After patients were classified
into a satisfied and an unsatisfied category using the question that specifically pertains to satisfaction with hand function, the authors applied multivariate logistic regression modeling to identify independent predictors of patient satisfaction.

RESULTS:
At an average of 10 months (range, 6 to 12 months) after fasciectomy, 84 percent (n = 163) of the patients were satisfied with their hand function. In multivariate analyses adjusting for the degree of postoperative residual contracture (p < 0.001) and complications (p < 0.001), a higher preoperative Michigan Hand Outcomes Questionnaire hand appearance subscore and male gender predicted a higher likelihood of becoming satisfied after fasciectomy. Other patient- and disease-specific factors did not show evidence for an association with patient satisfaction.

CONCLUSIONS:
The findings of this study suggest that providers should consider assessing concerns about the appearance of the hand in patients with Dupuytren's contracture. They also highlight the importance of complication prevention and full contracture correction from the patient's perspective.