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Aesthetic dissatisfaction in patients with hand osteoarthritis and its impact on daily life

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Objectives: To evaluate the nature and extent of aesthetic dissatisfaction in patients with hand osteoarthritis (OA), and to investigate its impact on daily life and its determinants.

Method: Patients with primary hand OA, consulting secondary care, underwent physical examination for the number of joints with bony joint enlargements, soft tissue swelling and deformities, and radiographs. Questionnaires were filled in to measure pain and function (Functional Index for Hand Osteoarthritis, FIHOA), dissatisfaction with the appearance of the hands and its impact (aesthetic scales from the Michigan Hand Outcomes Questionnaire, MHQ), anxiety and depression (the Hospital Anxiety and Depression Scale, HADS), and illness perceptions (the revised Illness Perception Questionnaire, IPQ-R). Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated using multivariate logistic regression as measures of relative risk for dissatisfaction with appearance or its impact, adjusted for age, sex, body mass index (BMI), and joint-specific abnormalities (bony joint enlargements, deformities, or radiographic severity), self-reported pain and function.

Results: Of 247 patients (mean age 61.6 years, 88% women), 63 (26%) were aesthetically dissatisfied and 33 (13%) reported impact on daily life due to dissatisfaction. Patients with joint-specific abnormalities were at higher risk for reporting dissatisfaction. Patients who reported impact also reported more depression and negative illness perceptions, independently from joint-specific abnormalities.

Conclusions: Hand OA patients report aesthetic dissatisfaction with their hands regularly, especially in those with joint abnormalities. This dissatisfaction has a negative impact in a small group of patients who also reported more depression and negative illness perceptions. These results indicate the influence of psychosocial factors on outcome measures in patients with hand OA.

To evaluate the outcome of hand osteoarthritis (OA), all domains of interest should be assessed. Recently, hand OA patients have reported aesthetic damage as a domain of importance (1, 2).

Although aesthetic damage in hand OA has been described previously (2–4), the impact of dissatisfaction with hand appearance on daily life remains unclear. The Michigan Hand Outcomes Questionnaire (MHQ), a reliable and validated questionnaire, includes a scale assessing aesthetics of the hands, evaluating both dissatisfaction and the impact of dissatisfaction (5, 6).

Aesthetic dissatisfaction can be considered as part of clinical outcome that, in turn, results from disease processes and factors such as illness perceptions and coping responses. Illness perceptions are determinants of outcomes, according to Leventhal's Common Sense Model (CSM). Illness perceptions in OA were previously

associated with limitations in daily activities and quality of life, while changes in illness perceptions of OA patients were associated with changes in outcomes (7–10).

We evaluated the prevalence of aesthetic dissatisfaction in hand OA patients, its impact on daily life and its determinants.

Method

Study design

We used cross-sectional data from HOSTAS (Hand OSTeoArthritis in Secondary care), an ongoing study that has enrolled hand OA patients consecutively since 2009. Inclusion occurred when patients consulted the Rheumatology Outpatient Clinic of Leiden University Medical Centre (LUMC) for hand complaints and primary hand OA was diagnosed by the rheumatologist. Informed consent was obtained. Study was approved by LUMC's medical ethics committee.

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Demographics and clinical characteristics

Standardized questionnaires were used to collect demographics and clinical characteristics. At inclusion and once every 2 years thereafter, participants underwent a standardized physical examination. Distal interphalangeal (DIP), proximal interphalangeal (PIP), first interphalangeal thumb (IP-1), metacarpophalangeal (MCP), and first carpometacarpal (CMC-1) joints were evaluated for the absence or presence of bony joint enlargements and soft tissue swelling. 'Deformities' were assessed in DIP, PIP, IP-1, MCP-1, and CMC-1 joints.

Radiographs

DIP, PIP, IP-1, MCP, and CMC-1 joints were scored by WD using the Kellgren–Lawrence (KL) grading scale (maximum = 120). Intrareader reproducibility was high, with an intraclass correlation coefficient (ICC) of 0.95 (0.89–0.97) (11).

Pain and aesthetics

Since January 2011, pain and aesthetics were measured at inclusion and biannually by the corresponding MHQ subscales and calculated by summing five-point Likert scale responses. Pain was normalized to 0–100 (100 = maximum pain). Normalization was not applied to the aesthetics subscale (on which higher scores = better hand performance), which contained one question measuring satisfaction with appearance of the hands (range 1–5, lower scores = more dissatisfaction) and three questions concerning its impact, namely discomfort in public, depression, and/or interference with normal social activities (range 1–5 for each question, lower scores = more impact) (6). A score of < 3 was considered as dissatisfaction and a score of < 3 for either one of the questions concerning impact was considered as experiencing impact.

Left and right hand scores were averaged, when no statistical differences were seen (Wilcoxon signed-rank test).

Disability

The Functional Index for Hand OA (FIHOA) rates disability on a 10-item questionnaire, all on a four-point Likert scale (0–30) (12).

Anxiety and depression

Anxiety and depression were measured by the Hospital Anxiety and Depression Scale (HADS; item range 0–3, 3 = worst). Subscale scores, ranging from 0 to 21 (higher scores = higher anxiety or depression) (13), were divided into three ranges (14).

Illness perceptions

The revised Illness Perception Questionnaire (IPQ-R) measures patients' cognitive and emotional representations of their illness (15, 16). The IPQ-R contains the following subscales: (i) 'identity', which measures whether 14 common symptoms are related to their OA according to participants, (ii) 'acute/chronic timeline' (higher score = more beliefs on chronicity), which represents the likely chronic duration of their illness, (iii) 'consequences' (higher score = more consequences), which reflects the consequences of their illness, (iv) 'personal control' (higher score = higher perceived control), (v) 'treatment control' (higher score = higher perceived efficacy of medical treatment), which represents the effect of the treatment of their disease, (vi) 'illness coherence' (higher score = higher coherence), which reflects the patient's perceived understanding of OA, (vii) 'cyclical timeline' (higher score = stronger belief in cyclical nature of OA), which represents the likely variability of their disease, and (viii) 'emotional representations' (higher score = more negative emotions), which reflect negative emotions experienced due to OA.

Data analysis

To investigate determinants of dissatisfaction with appearance and its impact, odds ratios (ORs) with 95% confidence intervals (CIs) were calculated using multivariate logistic regression as measures of relative risk, while adjusting for age, sex, and body mass index (BMI). Additionally, multivariate analyses were performed adjusting for joint-specific variables or radiographic severity when appropriate. All analyses used SPSS version 20 (SPSS Inc, Chicago, IL, USA).

Results

Study population

Between May 2009 and 13 July 2012, 293 patients were included in the HOSTAS study and 253 patients completed the aesthetic scale of the MHQ. Six patients were excluded later, when the diagnosis changed. For this analysis, 247 patients were included, using the first available MHQ (Table 1).

Ninety-one per cent of patients met the American College of Rheumatology (ACR) criteria for hand OA and 193 patients (with 210 available radiographs) had at least one DIP or PIP joint with KL scoring ≥ 2 .

Aesthetic dissatisfaction and its determinants

Sixty-three (26%) of the patients reported dissatisfaction with the aesthetics of their hands (median score = 4.0,

Table 1. Characteristics of the 247 patients with hand OA in HOSTAS, diagnosed at the rheumatology outpatient clinic.

Women, n (%)	217 (88)
Age (years), mean (sd)	61.6 (8.7)
BMI (kg/m ²)	26.5 (17.6–47.7)
Kellgren–Lawrence score (range 0–120)	21 (0–75)
Number of joints affected* (0–30), n (%)	5 (0–21)
Number of erosive joints† (0–18), n (%)	0 (0–13)
Duration of symptoms (years)	5.6 (0.1–58.7)
Joints with bony enlargements (0–30), mean (sd)	11.4 (5.4)
Deformed joints (0–22)	5.0 (0–17)
Joints with soft tissue swelling (0–30)	0 (0–17)
MHQ pain (0–100), mean (sd)	43.2 (19.1)
FIHOA (0–30)	8.0 (0–24)
HADS anxiety (0–21)	4.0 (0–18)
HADS depression (0–21)	2.0 (0–17)
IPQ-R dimensions	
Identity (0–14)	5.0 (0–13)
Timeline acute/chronic (6–30)	26.4 (12–30)
Consequences (6–30)	16.0 (6–30)
Personal control (6–30)	19.0 (6–29)
Treatment control (5–25)	14.0 (5–22)
Illness coherence (5–25)	19.0 (7–25)
Timeline cyclical (4–20)	14.0 (5–20)
Emotional representation (6–30)	13.5 (6–30)

OA, Osteoarthritis; BMI, body mass index; MHQ, Michigan Hand Outcomes Questionnaire; FIHOA, Functional Index for Hand Osteoarthritis; HADS, Hospital Anxiety and Depression Scale; IPQ-R, revised Illness Perception Questionnaire; sd, standard deviation.

*Number of joints with Kellgren–Lawrence grade \geq 2.

†At least one interphalangeal joint.

Values are given as median (range) unless stated otherwise.

range 1–5, Supplementary Appendix 1). Five male and 58 female patients reported aesthetic dissatisfaction.

We hypothesized that visible abnormalities of the hands and clinical symptoms (i.e. bony enlargements, soft tissue swellings, deformities, and self-reported pain) could play a role in aesthetic dissatisfaction. Deformities were independently associated with dissatisfaction. Bony enlargements were associated with dissatisfaction but no longer after adjustments (Table 2). Like deformities and bony enlargements, radiographic damage also belongs to the structural damage domain and was associated with dissatisfaction (Supplementary Appendix 2).

Anxiety, depression, and IPQ-R scales were not associated with aesthetic dissatisfaction, with the exception of emotional representations.

Impact due to dissatisfaction and its determinants

Thirty-three (13%) patients (one male and 32 females) reported impact due to dissatisfaction. The median score was 5 for each of the three separate items (range 1–5, lower scores = more discomfort, depression, and interference; Supplementary Appendix 1).

Bony enlargements, deformities, and self-reported pain were associated with impact due to dissatisfaction of hand appearance (Table 2), along with self-reported disability (see Supplementary Appendix 3). After further adjustments for joint-specific factors, only self-reported pain and radiographic damage remained. After adjustments, depression remained associated (Table 3) with impact. Higher scores for consequences and emotional

Table 2. Multivariate analyses for the determinants of aesthetic dissatisfaction and impact due to aesthetic dissatisfaction.

	Aesthetic dissatisfaction		Impact due to aesthetic dissatisfaction	
	Adjusted OR (95% CI)*	Adjusted OR (95% CI)†	Adjusted OR (95% CI)*	Adjusted OR (95% CI)†
Age	1.02 (0.99–1.06)	0.99 (0.95–1.03)	1.02 (0.98–1.07)	0.98 (0.92–1.03)
Sex	1.92 (0.69–5.36)	1.12 (0.36–3.53)	5.48 (0.71–42.33)	1.71 (0.19–15.03)
BMI	0.97 (0.91–1.04)	1.00 (0.93–1.08)	1.02 (0.94–1.10)	1.04 (0.94–1.14)
Bony joint enlargements tertiles				
0–8	1.0	1.0	1.0	1.0
9–14	1.76 (0.73–4.23)	1.14 (0.44–2.93)	3.00 (0.85–10.56)	2.99 (0.75–11.86)
\geq 15	3.12 (1.29–7.56)‡	1.95 (0.76–5.01)	4.12 (1.15–14.84)‡	3.59 (0.86–15.00)
Deformed joints tertiles				
0–4	1.0	1.0	1.0	1.0
5–6	2.66 (1.05–6.71)	2.37 (0.92–6.10)	2.39 (0.72–7.97)	1.76 (0.49–6.31)
\geq 7	6.21 (2.55–15.13)‡	5.23 (2.05–13.36)‡	4.39 (1.38–13.94)‡	2.72 (0.78–9.54)
Swollen joints hands	1.07 (0.95–1.20)		1.10 (0.94–1.28)	
MHQ pain scale tertiles				
0–34	1.0	1.0	1.0	1.0
35–51	1.71 (0.79–3.70)	1.35 (0.58–3.12)	3.95 (0.82–19.11)	2.65 (0.52–13.60)
52–100	1.94 (0.89–4.24)	1.38 (0.58–3.27)	12.60 (2.82–56.41)‡	10.30 (2.20–48.14)‡

BMI, Body mass index; MHQ, Michigan Hand Outcomes Questionnaire; OR, odds ratio; CI, confidence interval.

*Adjusted for age, sex, and BMI.

†Multivariate model with age, sex, BMI, bony joint enlargements, deformed joints, and self-reported pain.

‡p-value < 0.05.

Table 3. Multivariate analyses for personal determinants of impact due to aesthetic dissatisfaction.

	Adjusted OR (95% CI)*	Adjusted OR (95% CI)†
HADS anxiety range		
0–7	1.0	1.0
8–10	1.50 (0.47–4.81)	1.09 (0.31–3.91)
11–21	6.08 (2.15–17.18)‡	2.34 (0.68–8.09)
HADS depression range		
0–7	1.0	1.0
8–10	3.49 (1.11–10.96)‡	2.37 (0.64–8.82)
11–21	16.38 (4.34–61.89)‡	10.54 (1.97–56.29)‡
IPQ-R subscales		
Identity	1.27 (1.10–1.48)‡	1.18 (0.99–1.40)
Timeline chronic	1.06 (0.95–1.20)	1.02 (0.90–1.17)
Consequences	1.24 (1.12–1.38)‡	1.19 (1.06–1.34)‡
Personal control	1.07 (0.95–1.20)	1.03 (0.92–1.17)
Treatment control	0.88 (0.76–1.03)	0.87 (0.73–1.03)
Illness coherence	0.81 (0.73–0.90)‡	0.84 (0.75–0.94)‡
Timeline cyclical	0.94 (0.83–1.08)	0.95 (0.83–1.09)
Emotional representation	1.19 (1.10–1.30)‡	1.14 (1.05–1.25)‡

HADS, Hospital Anxiety and Depression Scale; revised IPQ-R, Illness Perception Questionnaire-Revised; OR, odds ratio; CI, confidence interval.

*Adjusted for age, sex, and BMI.

†Adjusted for age, sex, BMI, bony joint enlargements, deformed joints, and self-reported pain.

‡p-value < 0.05.

representation and lower scores for illness coherence were associated with impact (Table 3). Additional analyses including radiographic damage gave the same results. Analyses investigating disability instead of self-reported pain showed similar results (data not shown).

Discussion

This is the first study to investigate impact on certain aspects of daily life due to aesthetic dissatisfaction in hand OA patients using validated questionnaires. We found that although the hand OA patients experienced dissatisfaction with the appearance of their hands regularly, impact due to this dissatisfaction was reported by only a small group of patients. Patients with joint-specific determinants were at higher risk for reporting dissatisfaction. Patients who reported impact also reported more depression and negative illness perceptions. Personal factors were mainly associated with impact and not simply with aesthetic dissatisfaction. These results indicate the influence of personal factors on outcome measures in hand OA patients.

Deformed joints were only associated with aesthetic dissatisfaction. After adjustments, only a trend remained between bony enlargements and either aesthetic dissatisfaction or impact. This loss of association may be due to a lack of power since bony enlargements were associated with high aesthetic

concern in the first in-depth study on this domain (2). Self reported pain, disability (assessed by the FIHOA), and radiographic damage remained associated with impact due to dissatisfaction.

In contrast to the previous study (2), a relatively small group of our patients experienced impact due to dissatisfaction. This difference in findings may be due to differences in methods. Previously (2), assessment occurred by posing one standardized question to indicate the aesthetic impact of hand OA (scale of 0–100, 100 = maximal aesthetic discomfort). Participants could interpret this as assessment of the aesthetic impact of hand OA or just aesthetic dissatisfaction; the group experiencing impact could be smaller. In HOSTAS, this was measured separately.

However, the previous group of hand OA patients experiencing impact could indeed be larger, possibly because of cultural differences.

In line with our expectations and previous study, depression was associated with impact, but not aesthetic dissatisfaction (2).

IPQ-R subscales were only associated with impact, with the exception of emotional representations. We expected that aesthetic dissatisfaction in particular depends more on joint-specific determinants and less on personal determinants. By contrast, patients with negative illness perceptions experienced more impact.

Our study had its limitations. In this study the MHQ was assessed in 247 patients, whose data were subsequently used for all analyses. Unfortunately, we were limited by missing data, although data from clinical examination and questionnaires were available for the vast majority of patients.

We were interested in factors associated with aesthetic dissatisfaction, so neutral satisfaction was grouped with satisfaction. If the neutral group was excluded, we may have found stronger associations.

The aesthetic scale of the MHQ is designed to yield one score. For a better understanding of the item aesthetic dissatisfaction and also of the impact that aesthetic dissatisfaction may lead to, we separated the scores and grouped patients who scored low on any one of the three aesthetic questions concerning impact. This was necessary to distinguish between the presence of just aesthetic dissatisfaction and impact due to aesthetic dissatisfaction.

Programmes teaching self-management skills can improve clinical outcomes in people with OA (17). Our results have shown that patients who experienced more impact from hand OA also reported having negative perceptions. We hypothesized that patients with negative perceptions, particularly those who report having a lower degree of understanding of their OA, may benefit especially from self-management training. The incorporation of self-management as a part of the treatment of hand OA patients should be considered in clinical practice. Future research on the aesthetics of hand OA is necessary to further our understanding and to confirm our hypotheses.

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Supporting Information

Additional Supporting Information may be found in the online version of this article.

Supplementary Appendix 1: Prevalence of the Michigan Hand Outcomes Questionnaire aesthetics score, comprised of four questions: aesthetic satisfaction (lower scores = less satisfaction), discomfort in public (lower scores = more discomfort), depression (lower scores = more depression), interference normal social activities (lower scores = more interference).

Supplementary Appendix 2: Multivariate analyses for the determinants of aesthetic dissatisfaction and impact due to aesthetic dissatisfaction.

Supplementary Appendix 3: Multivariate analyses for the determinants of aesthetic dissatisfaction and impact due to aesthetic dissatisfaction.

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