**Table 1**
HLA-B*51 subtypes frequencies in Italian Behçet's syndrome patients compared with healthy controls.

| | BS patients, *n* (%) *n* = 152 | HC, *n* (%) *n* = 320 | *P*-value | RR (95% CI) |
|---|---|---|---|---|
| B*51 | 98 (64.5%) | 54 (16.9%) | < 0.01 | 3.82 (2.92–5.01) |
| B*51:01 | 76 (50.0%) | 49 (15.3%) | < 0.01 | 2.78 (2.18–3.54) |
| B*51:02 | 2 (1.3 %) | 0 (0.0%) | < 0.05 | 3.13 (2.75–3.58) |
| B*51:03 | 0 (0.0%) | 0 (0.0%) | NS | |
| B*51:04 | 0 (0.0%) | 0 (0.0%) | NS | |
| B*51:05 | 1 (0.7%) | 0 (0.0%) | NS | |
| B*51:06 | 0 (0.0%) | 0 (0.0%) | NS | |
| B*51:07 | 1 (0.7%) | 1 (0.3%) | NS | |
| B*51:08 | 18 (11.8%) | 3 (0.9%) | < 0.01 | 2.88 (2.30–3.61) |
| B*51:09 | 0 (0.0%) | 1 (0.3%) | NS | |
| B*51:10-63 | 0 (0.0%) | 0 (0.0%) | NS | |

BS: Behçet's syndrome; HC: healthy controls; *n*: number of subjects; NS: not significant; RR: relative risk; CI: confidence interval.

was 64.5% (98/152) in BS patients and 16.9% (54/320) in the control group. The difference was statistically significant ($P < 0.01$, RR 3.82, CI 2.92–5.01). Half of BS patients showed the B*51:01 subtype, while its percentage was equal to 15.3% in HC ($P < 0.01$, RR 2.78, CI 2.18–3.54). B*51:08 frequency was higher in BS group (11.8%) than in HC (0.9%) ($P < 0.01$, RR 2.88, CI 2.30–3.61). B*51:02 subtype was found in two BS patients (1.3%) and in none of the control group. The difference was statistically significant ($P < 0.05$, RR 3.13, CI 2.75–3.58). B*51:05 and B*51:07 were rare subtypes with the same distribution in the patients group (0.7%); in the control group the first subtype was absent, while the frequency of the second-one was 0.3%. All other HLA-B*51 subtypes were absent in both groups, except for B51*09, that was found in 1 of HC.

We found a higher frequency of HLA-B*51 in the patients group compared to HC. B*51:01 was the most common allele in our cohort, as reported in previous studies analysing the distribution of HLA-B*51 subtypes in Italy [7,8]. In our study, HLA-B*51 subtyping was performed on a larger number of BS patients and included a higher number of subtypes in comparison with these previous studies. We also confirmed the high frequency of B*51:08 subtype and found the association between B*51:02 and BS susceptibility, to be validated in functional studies investigating the association between HLA molecules and BS. The relationship between BS and HLA-B*51 subtypes was investigated in various ethnic groups and HLA-B*51:01 was identified as the major risk allele in different ethnic groups, such as Greek, Spanish, Saudi Arabian, Iranian, German, Turkish and Japanese patients, not in Israelian population. The differences in frequency distribution could be associated to the differences in sample size and mostly the variability among populations of various genetic ancestry [4,5]. Future studies will be performed to correlate the HLA-B*51 subtypes to the clinical phenotype.

## Ethical approval

The corresponding author certifies that all authors approved all the submitted material and contributed to the study.

## Disclosure of interest

The authors declare that they have no competing interest.

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## Importance of feelings of injustice in fibromyalgia, large internet survey on experiences of 4516 French patients

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Fibromyalgia (FM) has a major impact on everyday life [1]. Patients usually reports that FM is an unfair condition managed by sceptical physicians [2]. Indeed, higher levels of invalidation are reported in patients with FM than in those with more visible rheumatic conditions [3]. Perceived Injustice (PI) is defined as a combination of severity of loss, irreparability of loss, blame and sense of unfairness [4]. This feeling increases pain intensity, disability, painful behavior, fear of movement, catastrophyzing, depression and decreases rates of return to work [5]. We conducted a cross-sectional internet survey evaluating French patients' FM impact and PI on quality of life as assessed by the Fibromyalgia Impact Questionnaire (FIQ) [6]. A 103-item auto-questionnaire

**Table 1**
Patients' demographic data.

| | | |
|---|---|---|
| Mean age | | 48.1 years (SD: 10.7) |
| Women | | 4185 (93%) |
| Living with a partner | | 3132 (69%) |
| With children | | 3608 (80%) |
| With dependent children (still living at home) | | 2166 (60%) |
| Living in a rural environment | | 2005 (44%) |
| Household income | Less than €1000 | 676 (15%) |
| | €1000–€1800 | 870 (19%) |
| | €1800–€3000 | 1358 (30%) |
| | More than €3000 | 1612 (36%) |
| Professional status | In work | 1483 (33%) |
| | Unemployed | 1254 (28%) |
| | On sick leave | 570 (13%) |
| | Part-time work for medical reasons | 1014 (22%) |
| | Retired | 195 (4%) |
| Compensations received | Unemployment benefit | 322 (27%) |
| | Income support | 164 (14%) |
| | Disability allowance | 378 (31%) |
| | None | 294 (24%) |
| Disability | | 931 (21%) |
| Level of disability | Category 1 | 330 (35%) |
| | Category 2 | 567 (61%) |
| | Category 3 | 35 (4%) |
| | Definitive total disability | 391 (17%) |
| Depressive symptoms | 1616 (48%) | |
| Feelings of injustice | 3467 (77%) | |
| Injustice related to FM | 2470 (71%) | |
| Injustice related to care/treatment | 1532 (44%) | |
| Injustice related to work | 1430 (41%) | |
| Osteoarthritis | 1655 (49%) | |
| Hypothyroidism | 502 (15%) | |
| Endometriosis | 380 (11%) | |
| Hyperthyroidism | 250 (7%) | |
| Diabetes | 202 (6%) | |
| Rheumatoid arthritis | 142 (4%) | |

was posted in a national French website (e-health Sanoia platform) according to the Outcome Measures in Rheumatology [7]. Details of the methods were previously reported [8]. The statistical analysis included descriptive statistics, Chi$^2$ tests and a multiple-regression analysis to identify factors (including PI) independently associated with quality of life.

All of the 4516 patients completed the questionnaire (Table 1). Feelings of injustice are reported by 77% of the participants. These feelings of injustice are related directly to fibromyalgia in 71% of cases, treatment and/or care in 44% and work in 41% (Table 1). We observed that there is significantly more PI in depressed people (85% vs. 70% – $P < 0.0001$) but it is not correlated with the existence of depression before fibromyalgia occurrence. PI is more frequent if suicide thought is present (88% vs. 69%, $P < 0.0001$). There is more PI when claims for social benefits (81% vs. 71%, $P < 0.0001$) or if the pathology is not recognized by employer (78% vs. 72%, $P < 0.0001$). There is no impact of demographic features on PI ($P = 0.1$).

In this population, the impact of FM is moderate (average FIQ Score of 51/100). FIQ score is however significantly affected by feelings of injustice (+5.1 points) (Table 2). Other factors affecting quality of life are low family income, part-time working and concomitant rheumatoid arthritis. The impacts of other clinical symptoms is not significant.

Despite some limitations (self-declaration, recruitment via patients' associations, patients capable of using computer tools and lack of standardized evaluation tools other than the FIQ), this large French study shows the importance of perceived injustice in FM patients. Such feelings often arise when there seems to be no reason to the pain or the disease, as it is frequently the case in FM, which symptoms are not associated with organic lesions. Rheumatologists should be aware of these feelings in order to help patients feel better (recognition of the disease, reassurance and education) [2,9]. Indeed, a therapy such as acceptance and anger based interventions could be appropriate [10]. Moreover, applying the Injustice Experience Questionnaire (IEQ) to other chronic pain patients would be useful to seek if this feeling is shared by other rheumatic diseases [4].

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## Contribution of authors

All authors had access to the data and played a role in writing this manuscript.

## Disclosure of interest

Serge Perrot has been coordinator of a study carried out by Daiichi-Sankyo on fibromyalgia and was a member of advisory

**Table 2**
Factors associated with FIQ global score (0–100). Final multivariate model[a].

| Factor studied | Coefficient (95% confidence interval) | Degree of significance (*P*-value) |
|---|---|---|
| Household income (reference income €3000) | | |
| Income €1000 | 2.5 (1.4–3.6) | < 0.0001 |
| Income €1000-€1800 | 1.6 (0.6–2.5) | 0.0011 |
| Income €1800-3000 | 0.3 (−0.6–1.2) | 0.463 |
| Smoking (reference: non-smoker) | 1.2 (0.5–2.0) | 0.0005 |
| Professional status (reference: patient in work) | | |
| Professional status: unemployed | 1.7 (0.8–2.5) | 0.0002 |
| Professional status: sick leave | −0.4 (−1.4–0.7) | 0.483 |
| Professional status: part-time work for medical reasons | 2.9 (2.0–3.8) | < 0.0001 |
| Professional status: retired | 1.5 (−0.1–3.1) | 0.07 |
| Feelings of injustice (reference: no feelings of injustice) | 5.1 (4.4–5.9) | < 0.0001 |
| Periods of remission (reference: no period of remission) | −3.3 (−4(−)–2.7) | < 0.0001 |
| Copresence of rheumatoid arthritis | 3.4 (1.8–4.9) | < 0.0001 |
| Copresence of osteoarthritis | 0.7 (0.1–1.3) | 0.03 |

[a] Models were constructed in several steps, including variables following the chronological order of the phenomena/events: constitutional characteristics, current social context data, current FM perception and severity and comorbidities. Collinearity was checked for each step, and not found significant.

boards on fibromyalgia for Pfizer, Pierre-Fabre and Lilly in 2010-2014.

The other authors declare that they have no competing interest.

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## Fibrodysplasia ossificans progressiva at whole-body low-dose computed tomography

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Whole-body low-dose computed tomography (WBLDCT)

Fibrodysplasia ossificans progressiva (FOP, stone man syndrome) is a rare genetic connective tissue disorder and the most disabling condition of heterotopic ossification in humans [1,2]. We propose to consider Whole-body low-dose computed tomography (WBLDCT) as a useful imaging tool in this condition.

Here is the case of a 34-year-old woman with FOP diagnosed at the age of twelve, who was referred to our radiology department for a detailed skeletal survey before potential inclusion in a trial involving inhibitors of ALK2 signaling. We performed a WBLDCT to provide, at low dose and in a short scanning time (25s), a precise and exhaustive 3D cartography of heterotopic ossifications and their repercussions on spine and joints. Multiplanar reformatted (MPR) and volume rendered (VR) images (Fig. 1) showed dramatic ribbons of hard bone extending from nuchal ligament to the lower cervical spine, bridging the humerus, scapulas, and the chest cavity ("tree branching pattern"), and fixing the lumbar spine to the left iliac crest. The 3D images optimally explained the limited mouth opening, restricted chest expansion, and ankylosis of pelvic girdle.

Advances in CT technology allows the use of low-dose CT protocols whilst preserving sensitivity and image details for high contrast structures [3]. Whole-body low-dose CT protocols were first introduced in the staging and monitoring of multiple myeloma patients [4], and have demonstrated their superior sensitivity to conventional radiography in staging of multiple myeloma [5]. The accuracy of low-dose CT protocols has been assessed for either other organs such as the lung parenchyma [6] or the lumbar spine [7], or pathologic entities such as oncologic follow-up [8]. But to our knowledge, the advantages of WBLDCT to evaluate FOP patients have never been highlighted. Technical advantages consist of: a 3D whole-body coverage (from head to toe), absence of bone superpositions effect on diagnostic performances, and pre-osseous formations detection [9,10]. Moreover, patient convenience is an important practical advantage for WBLDCT. Indeed, short scanning time (25s) of WBLDCT makes the exploration more comfortable for the patient who cannot remain seated, and will most likely remain feasible irrespective of the inevitable mobility decline. The implementation of a low-dose CT protocol, whilst still highly sensitive for high contrast structures such as ossifications, allows for an optimized radiation exposure and repeated acquisitions during follow-up in emerging clinical trials.

## Disclosure of interest

The authors declare that they have no competing interest.