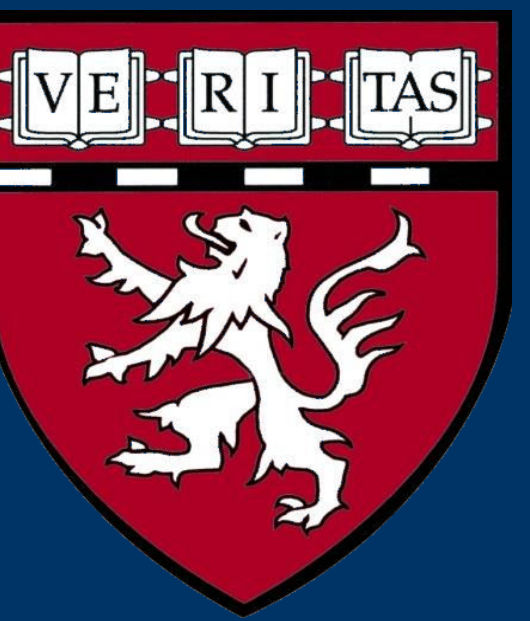




# The Association of Body Mass Index and Radiographic Progression of Joint Disease in Rheumatoid Arthritis



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## Introduction

- Prior studies suggest that lower BMI maybe associated with progression of radiographic joint damage in RA, but have yielded conflicting results.
- Some studies have only seen the association in seropositive patients while other data showed that both high and low BMIs were associated with worse function and disease activity, but not erosions.
- Whether the association of BMI and radiographic joint damage may be independent of RA disease activity is unknown.

## Aims

- To examine the relationship between BMI and radiographic joint damage in relation to disease activity in a cohort of RA patients.

## Methods

### Study Population:

- 543 RA patients enrolled in the Brigham and Women's Rheumatoid Arthritis Sequential Study (BRASS).
- Data collection includes joint examinations, blood draws and patient reported outcome measures annually.
- Hand and wrist radiographs were acquired at baseline and 2 years.
  - X-rays were scored by the van der Heijde-modified Sharp Score (vdHSs).

### Definition for Radiographic Progression:

- Patients having a change of  $\geq 10$  units in total vdHSs over two years (Baker et al, 2011).

### Definition of BMI group:

- Underweight  $<20\text{kg/m}^2$ ; Normal  $20\text{-}24.9\text{kg/m}^2$ ; Overweight  $25\text{-}29.9\text{kg/m}^2$ ; Obese  $\geq 30\text{kg/m}^2$ .

### Statistical Analyses:

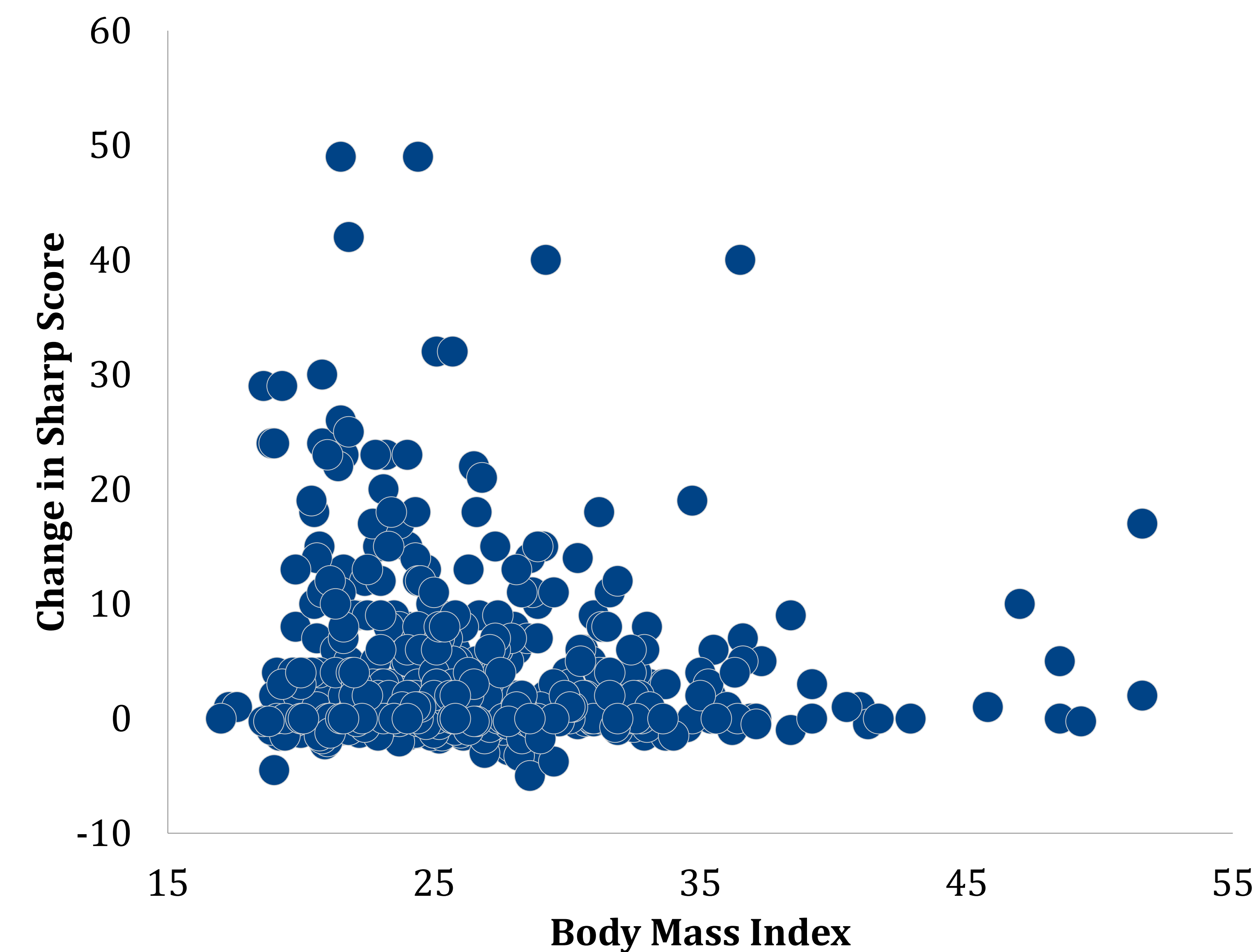
- Change in sharp scores over two years in relation to body mass index (Figure 1).
- Univariate analyses to assess predictors of radiographic joint damage progression that included: age, gender, BMI group, DAS28-CRP4, and anti-CCP status.
- Multivariate logistic regression model using backward selection to study the association between BMI and radiographic progression (Table 2).

## Results

Table 1. Baseline Characteristics

Variable	Radiographic Progressors (N=71)	Non-Progressors (N=472)	P-Value
Age, years (M, SD)	58.5 (11.9)	57.5 (12.8)	0.53
Race (White) (N,%)	65 (95.6)	441 (93.6)	0.53
Gender (female) (N,%)	59 (85.5)	389 (82.6)	0.55
Disease Duration, years (M, SD)	15.4 (11.7)	14.2 (12.3)	0.45
<b>BMI (M, SD)</b>	<b>25.11 (5.7)</b>	<b>26.8 (5.3)</b>	<b>0.02</b>
Current Smoker (N, %)	4 (6.2)	40 (8.9)	0.61
<b>Anti-CCP + (N, %)</b>	<b>56 (81.2)</b>	<b>306 (66.4)</b>	<b>0.01</b>
<b>DAS28-CRP4 (M, SD)</b>	<b>4.5 (1.5)</b>	<b>3.9 (1.6)</b>	<b>0.005</b>
MHAQ Score (M, SD)	0.41 (0.4)	0.40 (0.5)	0.91

Figure 1. Change in Sharp Score over two years in relation to Body Mass Index



- The following predictors were significantly associated with radiographic progression in the univariate analysis: age, gender, BMI (group), anti-CCP+, and DAS28-CRP4.

## Results

Table 2. Association of BMI and Odds of Radiographic Joint Damage Progression in RA.

Multivariate Logistic Regression Model*	Odds Ratios	95 % Confidence Intervals
BMI (underweight vs. normal)	1.22	0.41-3.63
<b>BMI (overweight vs. normal)</b>	<b>0.41</b>	<b>0.22-0.78</b>
<b>BMI (obese vs. normal)</b>	<b>0.22</b>	<b>0.11-0.57</b>
<b>DAS28-CRP4 (continuous)</b>	<b>1.28</b>	<b>1.08-1.51</b>
Anti-CCP Positive	1.85	0.96-3.57

\*adjusted for age and gender

## Results

- Patients who were overweight or obese at baseline had significantly decreased odds of having radiologic progression of joint damage compared to patients who were normal weight.
- Having a higher DAS28-CRP4 score at baseline was associated with greater odds of having radiologic joint damage.

## Strengths/Limitations

- Study included large number of subjects with longitudinal data.
- No data on body fat composition, RA treatments, exercise, or bone density/osteoporosis.

## Conclusions

- Lower BMI was associated with radiographic joint damage in RA patients with established disease, independent of disease activity.
- Future studies to assess possible biological pathways for the association of BMI and radiographic joint disease progression are needed.

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