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CORR Insights®: Reduction in Cylindrical Grasp Strength Is Associated With Early Thumb Carpometacarpal Osteoarthritis

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Where Are We Now?

Osteoarthritis (OA) of the thumb carpometacarpal (CMC) joint is exceedingly common [1]. Weakness and pain from this condition limit daily activities, although studies show only a weak

correlation between patients' symptoms and radiographic findings, making clinical evaluation all the more essential [4, 5].

Clinicians generally evaluate weakness of the thumb by measuring the patient's pinch and grip strength using a handgrip dynamometer. However, the dynamometer, by virtue of its shape and hand orientation, does not faithfully evaluate the impact of thumb conditions on the grip strength. Coughlan and colleagues introduced cylindrical grasp measurements, a novel method to evaluate changes in grip strength in patients with early thumb CMC OA. This more accurately determines the impact of thumb pathology on grip strength, as it requires more participation of the thumb [11], and places the thumb in its normal posture.

Although there is ample evidence to support the association of weakness of grip and pinch strength with advanced thumb CMC OA [8–10], the challenge is detecting the subtle changes of grip and pinch in early thumb CMC OA [5, 6]. Coughlan and colleagues concluded that reduction in cylindrical grasp was associated with early thumb CMC OA, whereas gross grasp was not. This also suggests that cylindrical grasp may be a more-sensitive tool for detecting early thumb CMC OA.

Where Do We Need To Go?

The thumb's action is more complex than a simple pinch or grip. Currently, we rely on evaluating pure pinch or pure grip strength as a guide to understanding the deterioration of hand function as the disease progresses. But we still do not know whether these measurements actually reflect the weakness that patients experience during their daily living activities [7, 8]. We need better approaches to examining thumb function during daily living activities such

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as opening jars, getting dressed, or food preparation [8, 10]. Perhaps the use of an electronic sensor could be fitted at the base of the thumb to monitor the forces across the thumb CMC joint during the actual use of the thumb. This would better quantify the loss of strength in different stages of the disease.

We also need to examine the correlation between the pinch and grip-strength measurements and patients' perceptions about difficulties using their thumbs.

How Do We Get There?

Despite the weak correlation between clinical and radiographic findings [2, 4], we still rely on radiographic staging to define the disease severity [4, 5]. A staging system that incorporates the clinical disease severity may be more useful as a guide to the use of specific treatment modalities.

Additionally, we need to determine if there is a correlation between grip and pinch strength measurements and the actual difficulties the patients' experience. A longitudinal study linking the changes in grip and pinch strength and patients' subjective self-evaluation questionnaire may provide some answers to these questions.

Patients with incidental finding of thumb CMC OA are a unique subset of

the OA patient population. Studying this group of patients would help us determine whether pain is the main factor in causing weakness of grip and pinch and thumb deformity or perhaps there are other factors that contribute to thumb dysfunction [2–4]. Understanding why some patients have hand function limitation and advanced radiographic disease, but few or no symptoms, could potentially nail down the factors responsible for deterioration of hand function in the different stages of the disease process.

The wide use of cylindrical grasp measurements in longitudinal studies may refine our understanding of the thumb contribution to hand grip-strength measurements [11]. This would enable us to better quantify the changes of the functional use of the thumbs as the disease progresses.

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