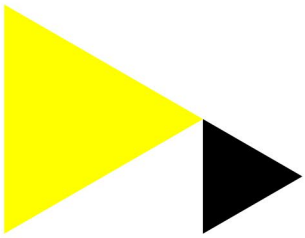
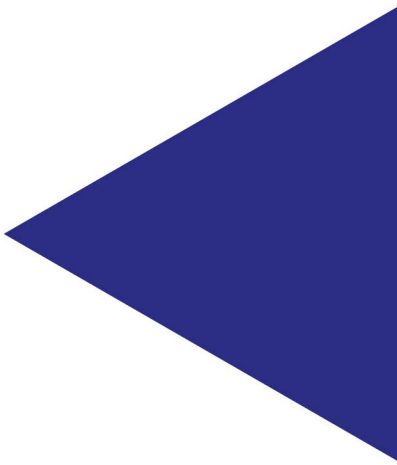
Clinimetrics: Assessment of generalised joint hypermobility: the Beighton score





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Appraisal

Clinimetrics: Assessment of generalised joint hypermobility: the Beighton score

Summary

Description: Joint hypermobility (JH) is defined as the ability of a joint to move beyond normal limits along physiological axes. Joint hypermobility is relatively common, occurring in 7 to 36% of children and adolescents, and in 2 to 57% of adult populations,[1–7] with higher rates amongst children, females, and Asian and African racial groups.

When JH is observed in fewer than five joints, it may be defined as localised joint hypermobility. Localised joint hypermobility affects a single small or large joint and may be bilateral, and may be an inherited or acquired trait related to trauma or training. The term generalised joint hypermobility (GJH) is preferred in individuals with JH at multiple sites (usually five or more).[8]

Joint hypermobility may occur as a result of non-pathological or pathological causes. In the non-pathological group, subjects do not develop severe musculoskeletal complaints[5] and JH is even an advantage for some (eg, dance and music).[6] In the pathological group, JH is associated with musculoskeletal complications like pain and joint instability, which can lead to dislocations and distortions. Generalised joint hypermobility is frequently observed in hereditary connective tissue disorders, which are characterised by pathological connective tissue fragility in multiple organ systems and can be molecularly confirmed in most cases.[8] In addition, the current label for subjects with JH and musculoskeletal complications, who do not fulfil the criteria for hypermobile Ehlers-Danlos syndromes, is hypermobility spectrum disorders.[9]

The Beighton score: The Beighton score (BS) is considered to be the 'gold standard' for assessing GJH and is the most widely used.[10] The BS consists of five standardised tests, including four bilateral tests:

- First finger opposition: with arms outstretched forward but hand pronated, the thumb can be passively moved to touch the ipsilateral forearm.
- Fifth finger extension: with the palm of the hand and forearm resting on a flat surface with the elbow flexed at 90 deg, the metacarpal-phalangeal joint of the fifth finger can be hyperextended > 90 deg with respect to the dorsum of the hand.
- Elbow extension: with the arms outstretched to the side and forearm in supination, the elbow extends > 10 deg.
- Knee extension: while standing, with knees locked in genu recurvatum, the knee extends > 10 deg.
- Forward bending: with knees locked straight and feet together, the patient can bend forward to place the total palm of both hands flat on the floor just in front of the feet.

A score is obtained for each bilateral item (0: negative, 1: positive), with a total score ranging from 0 to 9. Recent research recommends variable cut-offs for the age, sex and cohort of interest.[11] In children, GJH is established at a cut-off value of ≥ 6; in adults to 50 years ≥ 5/9, whereas in adults aged > 50 years ≥ 4/9 is positive.[9,12]

Psychometric properties of the Beighton score: Concurrent validity of the BS score, according to the COSMIN criteria, is poor to fair; more studies are needed to confirm the validity.[12] A recent systematic review included 24 studies in 1,333 patients (age range 4 to 71 years). Inter-rater and intra-rater reliability were moderate to excellent using intraclass correlation coefficients. The authors concluded that the BS is a highly reliable clinical tool with substantial to excellent inter-rater and intra-rater reliability when used by raters of variable backgrounds and experience levels.[13] While individual components of risk of bias among studies demonstrated large discrepancy, most of the items were adequate to very good.[13]

Commentary

The strengths of the BS are that it is a quick (5 minutes) and reliable tool to screen for GJH, is known worldwide, and requires no equipment, with the exception of a goniometer when joint range is equivocal. Limitations of the BS include that the evidence with respect to the validity is weak, and that it assesses a limited number of joints, mainly upper limb, while assessment of other joints that are commonly painful (eg, shoulder, hip, patellofemoral and ankle) remains unassessed. Also, the BS only assesses motion in the sagittal plane. Therefore, other comprehensive tools for JH have been developed and provide more detailed information about more joints in multiple planes of movement (eg, the Upper Limb Hypermobility Assessment Tool[14] and Lower Limb Assessment Score).[15,16]

Reliable, accurate and precise measures of JH and for identifying GJH are essential in children, adolescents and adults with musculoskeletal complaints, and contribute to diagnostics and tailored interventions. Generalised joint hypermobility is a risk factor for musculoskeletal conditions such as joint instability, impingement and sprains.[13] Furthermore, determining the localisation and generalisability of JH alongside functional assessments of joint stability, muscle strength, proprioception, pain, fatigue, disability and participation should lead to tailored, interdisciplinary management.

Provenance: Invited. Not peer reviewed.

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