

Standard Test Methods for Dynamic Evaluation of Glenoid Loosening or Disassociation¹

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1. Scope

1.1 These test methods measure how much a prosthetic glenoid component rocks or pivots following cyclic displacement of the humeral head to opposing glenoid rims (for example, superior-inferior or anterior-posterior). Performance is judged by the tensile displacement opposite each loaded rim after dynamic rocking.

1.2 The same setup can be used to test the locking mechanism of modular glenoid components, for example, for disassociation.

1.3 The test method covers shoulder replacement designs with both monolithic and modular humeral and glenoid components with either cemented or noncemented fixation.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information purposes only.

2. Referenced Documents

2.1 ASTM Standards:

E 4 Practices for Force Verification of Testing Machines²

F 1378 Specification for Shoulder Prostheses³

F 1839 Specification for Rigid Polyurethane Foam for Use as a Standard Material for Testing Orthopaedic Devices and Instruments³

3. Terminology

3.1 Definitions:

3.1.1 *glenoid*—the prosthetic portion that replaces the glenoid fossa of the scapula and articulates with a prosthetic replacement of the humeral head. It may consist of one or more components from one or more materials, for example, either all-polyethylene or a metal baseplate with a polymeric insert.

3.1.2 *humeral head*—the prosthetic portion that replaces the

proximal humerus or humeral head and articulates with the natural glenoid fossa or a prosthetic replacement.

3.1.3 *glenoid plane*—see Fig. 1. In symmetric glenoids, the

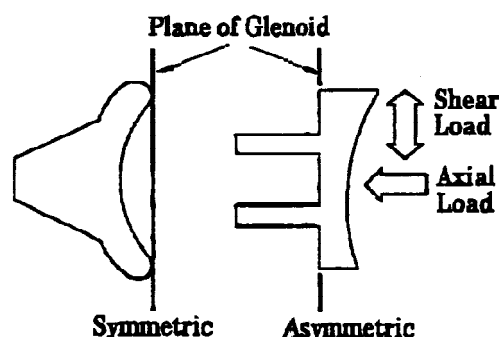


FIG. 1 Glenoid Plane and Load Directions

plane is defined by joining the two articular edges; in planar and asymmetric glenoids, it is defined by the back surface.

3.1.4 *axial load*; *axial translation*—the force and displacement, respectively, perpendicular to the glenoid plane; the axial load simulates the net compressive external and muscle forces (see Fig. 1).

3.1.5 *shear load*; *shear translation*—the force and displacement, respectively, parallel to the glenoid plane, applied, for example, in the superior/inferior or anterior/posterior direction (see Figs. 1 and 2); the shear load simulates the net shear external and active and passive soft tissue forces.

3.1.6 *subluxation load*—the peak shear load required for subluxation, for example, the peak resistive force at the glenoid articular rim opposing movement of the humeral head.

3.1.7 *subluxation translation*—the distance from the glenoid origin (see Fig. 2), parallel to the glenoid plane, to the point at which the subluxation load occurs.

3.1.8 *superior/inferior (SI)*, *anterior/posterior (AP)*—the SI axis is the longest dimension and the AP axis the widest dimension of the glenoid (see Fig. 2).

3.1.9 *edge displacements*—the translation, perpendicular to the glenoid plane, of a specific point on the outside edge of the glenoid, when subjected to loading (see Fig. 3).

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² Annual Book of ASTM Standards, Vol 03.01.

³ Annual Book of ASTM Standards, Vol 13.01.