Component 13: Pharyngeal Contraction

Pharyngeal contraction is scored in the AP view only. The pharyngeal contraction score represents a combination of pharyngeal shortening and stripping as viewed in the AP plane. When scoring pharyngeal contraction focus on the ability of the lateral pharyngeal walls to efficiently shorten and compress to assist with pharyngeal clearance. Observe the pharyngeal walls at rest and move frame by frame until they have obtained maximum movement, that is until they no longer demonstrate active inward compression (one frame prior to when the pharynx begins to return to rest). At that point, make your judgment about the relative degree to which the pharyngeal walls traversed inward from rest. To assist in assigning a score to observations of pharyngeal shortening, compare the position of the pit of the pyriform sinuses at rest to maximal displacement. To assist with judgments of pharyngeal stripping, observe inward compression of the lateral pharyngeal walls on the bolus tail through entry into the PES.

SCORING EXAMPLES

The following images are intended to help you differentiate between Pharyngeal Contraction scores 0-3. While a score of (0) is not representative of impairment, it is included to establish a visual baseline of adequate pharyngeal shortening and stripping.

(0) Symmetrical shortening and complete compression of the bilateral pharyngeal walls:

Symmetrical shortening and complete inward compression of the pharynx depicted by lateral walls that are relatively straight during shortening, and compress against the bolus tail, bilaterally, throughout the pharynx during the swallow. The lateral pharyngeal walls move inward applying pressure on the bolus tail through entry into the PES. You will observe a similar “stripping” pattern compared to what you view laterally when scoring Component 12, Pharyngeal Stripping Wave.

The image below highlights the pharyngeal walls (in yellow) as they shorten and compress against the bolus tail throughout the pharynx (A-C). The resting position of the bilateral pharyngeal walls is indicated in blue and provides a reference point for the degree of inward compression.
(1) Incomplete contraction represented by a dynamic pouch termed pseudodiverticulum:

Pseudodiverticula are not observed at rest. These dynamic pouches are only visible when filled with contrast during pharyngeal contraction (typically unilateral and in the high to mid-pharynx lateral to the valleculae). When observed, the pouch fills with contrast as the pharyngeal walls compress inward and empties as the pharynx returns to rest. The functional result of a pseudodiverticulum in patients with no other swallowing impairment is generally a small amount of pharyngeal residue that is efficiently cleared with a double swallow. When observed, the clinician should take note of any downstream resistance to bolus flow related to outflow obstruction in the region of the PES.

(2) Unilateral bulging of one pharyngeal wall:

This observation is an indirect measure or surrogate for pharyngeal muscle integrity. Unilateral bulging is distinguishable from a pseudodiverticulum in that it typically extends the full length of the pharynx and is distinct from a focal outpouching of the superior pharyngeal wall. More often than not, a weak pharyngeal wall will be distinguishable at rest as compared to the opposing wall.

(3) Bilateral bulging of both pharyngeal walls:

Bilateral, outward bulging of both pharyngeal walls. This observation is an indirect measure or surrogate for pharyngeal muscle integrity. Bilateral bulging extends the full length of the pharynx and may be distinguishable at rest as unusually enlarged pharyngeal spaces.
COMMON SCORING ERRORS

Judgements Based on Bolus Flow Patterns and Pharyngeal Residue

While bolus flow patterns and pharyngeal residue often correspond to pharyngeal function, be careful to not solely rely on bolus flow to make judgments about pharyngeal contraction. For example, the bolus may traverse to the right given anatomical variation (e.g. wide vs. omega shaped epiglottis) giving the appearance of right unilateral bulging, but upon close observation there is still symmetric, bilateral shortening and compression of the pharyngeal walls. Always watch for the integrity of the pharyngeal walls to compress inward, usually following the tail of the bolus.

Variation in Anatomy

In a live clinical setting you will find subtle, and occasionally dramatic, nuances in image framing and magnification dependent upon the radiologist and the fluoroscopy unit. Likewise, patients will have variable anatomy and morphology. Some patients may present with unusually enlarged pharyngeal spaces observed at rest, however, there may be no consequence of these enlarged spaces during the swallow itself. On the other hand, these enlarged spaces may represent decreased muscle tone or mass and in that case, there would be a functional consequence on swallowing. With that in mind, when you score, make your judgments about pharyngeal shortening and compression within the context of the individual patient. In the example below, patient A presents with a wide pharynx while patient B has closer approximation of the pharyngeal walls at rest. Both patients can still have robust pharyngeal shortening and stripping relative to their individual anatomy.
Hypopharyngeal and Esophageal Diverticula

The presence of hypopharyngeal and esophageal diverticula is frequently misinterpreted as unilateral bulging of the pharyngeal wall. Zenker’s diverticulum is the most common diverticulum of the upper gastrointestinal tract and arises from the cricopharyngeal muscle in the hypopharynx. Killian-Jamieson diverticulum originates in the cervical esophagus just below the level of the PES. Both upper gastrointestinal diverticula originate from an isolated area and exist outside the pharynx or cervical esophagus with no bearing on the integrity of pharyngeal contraction. When scoring the component, one has to dissociate the presence of the diverticulum from the physiology of pharyngeal contraction. Observe the vertical integrity of the pharyngeal walls even if a diverticulum is present.