



## “CHEWING CONSIDERATIONS” FROM A PRI PERSPECTIVE

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Impression formation is the process by which we form an overall impression of someone’s character and abilities based on available information about their characteristics, traits and behaviors. Probably the best impression that one can take of a human, to identify their individualism and behavior, is the mandibular bilateral molar print. Malocclusal or occlusal interference contact points on opposing teeth, or lack of, produced by the mandibular elevators and orchestrated by higher cortical centers, are the ‘thumbprints’ of patterned contact points of teeth, that can reflect an individual’s functional characteristic movement. This natural impression made by the mandible’s elevation to maxillary ‘bumpers’ or ‘stop’ points are more than likely designed around and associated with some various degree of:

1. mandibular malposition at rest and at closure,
2. imbalanced suprahyoid and infrahyoid muscle,
3. unlevelled scapulae and iliums,
4. mal-curvature of thoracic and lumbar segmental spinal vertebrate,
5. cranial temporal related torsion,
6. retro-palatal airway dys-regulation,
7. and limited pharyngeal airway patency.

This neurological imprint, created by, or contributing to the initial occlusal contact and secondary associated chewing pattern, is reflective of the central pattern generator in the brain stem and the autonomic nervous system. Both have a role in processing orofacial behavior and are manifested through compensatory and regulatory patterning of perceived postural security and safety.

Chewing, breathing, talking and swallowing all play an important role, on the teeth and mandibular system (stomatognathic system) as well as the postural and extremity system (forward locomotion system). The spine that is held up by the legs, and that holds up the head can be altered by descending, ascending or mixed directional cortical and cerebellar integrative information. Parafunctional habits of the mouth, as well as those habits of the mandible associated with eating, drinking or speaking, are included in the processing of input (afferent) and of output (efferent) information that has various levels of regulation of spinal function.

Spatial placement of the mandible, and the accompanying pharyngeal airway opening, is influenced by mandibular and spinal regulation, and ultimately dental occlusion. Normal chewing, eating, drinking and speaking function requires a position of closure or a place for the mandible to go to, at the end of elevation, where occlusal guidance and acceptance is complimented by corresponding neck orientation.

Recognition of asymmetry associated with mandible to head closure will assist in establishing normal chewing and prementioned associated function. The process of chewing should be



considered when one is attempting to alter biomechanics of abnormal neck to head, head to neck, mandible to head or head to mandible abnormal relationships, using oral appliances or Postural Restoration® approaches.

There is no “ideal” dental occlusion. Characteristics of harmonious occlusal relationships are usually formatted and adopted in compliance with head and neck physiological patterns and physical positions of least resistance. A very high percentage of humans are asymmetric with respect to a perfect pattern of symmetry. For this reason, asymmetry is considered to be something that is normal, always within the limits of statistical normality.

The literature will support that the right side is the preferred chewing side, for both hard and soft food. Therefore, central regulation of masticatory preference also exists. Mastication starts with this central regulation, but the sensory feedback of the food texture may affect the following chewing cycle. The side which is most comfortable and more effective for initial chewing usually is the right side. Initiation of mastication, and the side it was initiated, reflects both head and neck positional orientation built around comfort and control. Unilateral chewing on the right can lead to unilateral preference for lateralized dynamic functional influence on respiration, speech and deglutition, from tongue, mandibular, head and foot movement.

### ***Tongue Movement During Chewing***

Tongue movement is temporally linked with mandibular movement during food processing and chewing cycling. The tongue pushes laterally and the cheek pushes medially to reposition food on the occlusal surfaces before each closing stroke of the teeth occurs. The tongue moves anteroposterior, mediolaterally, and rotates on its three axes during chewing.

Those tongue movements can carry all or part of the food piece to the opposite side of the mouth during food processing. This exchange of lateral side food preparation also reverses the working and balancing sides of occlusion or chewing. Bilateral chewing is difficult, however, when unilateral preference for lateralized chewing function is primarily regulated and reinforced by right mandibular elevation and buccal and lingual trusive, rotary grind. The tongue becomes a strong co-partner with the mandibular chewing on the right and a strong co-partner with simultaneous intercalated left neck, head and maxillae stabilization and corresponding movement.

### ***Mandibular Movement During Chewing***

There are three essential periods of the mandible in connection to the maxilla:

The introductory contact with the food is where work is done by the mandibular elevators against gravity. Here the mandible is moving upwards and outwards, bringing the buccal cusps of the maxillary and mandibular teeth on the working (right) side in contact. [BUCCAL PHASE]

This is trailed by the power stroke where food is reduced. Here the mandibular teeth slide upwards and medially against the maxillary teeth to achieve the intercuspal position. [INTERCUSPAL PHASE]



Finally, the opening stroke, when the mandible is brought down with more of an underlying slower stage of movement than the closing stage. Here the mandibular teeth proceed downwards and inwards against the maxillary teeth. [LINGUAL PHASE]

When the teeth on the working right side are traveling through the buccal stage the right mandible is in the BUCCAL PHASE, while those on the adjusting left side are on a left mandible that is in the LINGUAL PHASE. Mandibular movement that takes place in the BUCCAL PHASE requires stabilization from the ipsilateral cheek, maxilla, and neck. Mandibular movement that takes place in the LINGUAL PHASE requires stabilization from the tongue.

### ***Head Movement During Chewing***

Mastication or chewing is a complex task that can become much more complex when the rotational, lateral, or anterior position of the head is not centralized between the feet when in upright stance. Chewing behavior and occlusal rest is best addressed when the head, neck and mandible are in a neutral state, with respect to the feet they are on and the position that the feet are in, during habitual stance. Active or passive adjustment of the head, neck or mandible will immediately influence the occlusal orientation and accompanying head, neck and body compensation through periodontal and plantar cutaneous afferent neuro-receptors.

Appropriate upright chewing during upright INTERCUSPAL PHASE of chewing is enhanced by ipsilateral head and neck stabilization. If the head is turned to the left, the stabilization provided by the right sternocleidomastoid, rectus capitis anterior, stylohyoid, styloglossus, stylopharyngeus, and lateral pterygoid provides good stabilization for molar to molar and pre-molar to pre-molar mastication.

### ***Other Chewing Considerations***

It is known that open-close jaw movements are controlled by the higher center (motor cortex, basal ganglia), masticatory rhythm generator, cerebellum, and peripheral afferent input.

The head – mandible rhythmical coupling might be controlled by bursts from the masticatory rhythm generator acting on the reflexes of the cervical muscle through the trigeminal – cervical reflex, stretch reflex, and posture reflex.

More than twenty muscles are involved in the procedure of human rumination. The masseter muscle is the essential ‘chomp constraint generator’ for chewing and swallowing.

The mandible crosses the midline and articulates with the temporo-mandibular joints, each of which possesses six degrees of freedom in humans. The jaw is driven by no less than 18 muscle gatherings, and the masticatory developments, which these muscles create, are usually asymmetrical.