ACTIVE MOTION MANAGEMENT (AMM) MODEL POLICY

This Model Policy addresses coverage for Active Motion Management (AMM) during external beam radiation therapy for 3D or IMRT photon delivery. This policy is intended to communicate coverage and documentation expectations and does not serve as a clinical guideline. Final coverage decisions remain subject to the terms of the applicable health plan and individual patient circumstances.

DESCRIPTION

Treatment delivery with active motion management (CPT 77412) includes intra-fraction localization and tracking of the target(s), and/or organs at risk (OAR)that occurs with physiological (internal systemic) motion. AMM is used to optimize beam delivery (e.g., intra-fraction motion, surface guidance). Intra-fraction motion management utilizes fiducials or imaging to monitor the target or OAR(s) during radiation delivery when motion would decrease dose to the target and/or increase dose to the OARs (e.g., *breath hold during a breathing cycle, respiratory motion monitoring, predefined serial intra-fraction imaging, prostate displacement related to bladder or rectal filling, bowel peristalsis monitoring that alters the position of the target or OAR*). Active motion management minimizes OAR and target motion uncertainty and allows more accurate delivery of radiation to mobile targets and active avoidance of OAR. AMM occurs during treatment delivery, although delivery may be halted to enable corrections.

During AMM, radiation delivery is controlled or modified (automatically or manually) in direct response to detected motion of the target (or validated surrogate) and/or relevant OARs.

Note: AMM often takes place after initial IGRT for patient setup and confirmation of isocenter position.

Gating and AMM are not used interchangeably. Gating is one example of an AMM technique in which the intrafraction physiologic motion of the target, surrogate or implanted marker is continuously monitored during radiation delivery. Radiation delivery occurs during the time that the monitored structure is within the predefined positional threshold (gating window) and is temporarily interrupted when the monitored structure moves outside of the gating window.

Defining threshold for AMM: AMM requires that motion information actively and continuously influences radiation delivery in real time (e.g., beam on/off decisions or beam adaptation) to a clinical target such that failure to track would result in unfavorable clinical consequences. If motion data does not directly influence beam delivery during treatment, the activity does not meet the definition of AMM. AMM is not applicable for patient movement evaluation that occurs in a static setup (e.g., patient coughing or arm movement), or simply for patient positioning prior to treatment delivery, but rather expected movement outside of preset parameters during the treatment processes every day.

Surface guidance (SGRT)

Surface guidance for active motion management is a technique that allows the linear accelerator to perform actions such as gating (e.g., optical) or active motion management during treatment delivery using the body surface contour as a surrogate for internal target motion and OAR avoidance. Surface guidance is one method to affect active motion management, although there are other methods as well.

SGRT used solely for patient positioning or monitoring without direct, real-time control of beam delivery based on motion data is considered IGRT/position management and not AMM. SGRT may be considered AMM when motion data are used to actively gate (automatic or manual) or otherwise control beam via continuous motion feedback during treatment based on preset parameters that would spare OAR or more accurately deliver dose to target.

Note: The intent of active motion management is not for patient setup prior to treatment delivery (e.g., not to replace tattoos).

COVERAGE CRITERIA

AMM may be considered medically necessary when intrafraction motion is expected to clinically affect target localization and/or OAR sparing and when real-time motion information is used to actively control radiation delivery (as defined above).

Required elements

- Motion tracking and management occur while radiation is being delivered (intrafraction), not solely before treatment initiation.
- Continuous monitoring of the target position (or valid surrogate) throughout beam delivery.
- Radiation delivery is actively dependent on motion data where the beam is either:
    - Gated (beam on/off, either automatically or manually), and/or
    - Adaptively modified based on target position during respiration or other motion.

Examples of enabling technologies (non-exhaustive)

- Respiratory gating systems.
- 4D respiratory correlated imaging systems.
- Pre-defined intra-fraction “Triggered” imaging used to support real-time delivery.
- Fiducial-based tracking monitored during treatment delivery.
- Real-time imaging systems (e.g., MR Linac, Surface-guided RT).
- Breath-hold techniques, such as Deep Inspiration Breath Hold (DIBH), when beam control is tied to the motion.

Not considered AMM / limitations

- Patient setup or positioning activities performed only prior to treatment delivery.
- Verification imaging (IGRT) without real-time beam control or intra-fractional feedback systems.
- Immobilization methods (e.g., abdominal compression) without dynamic beam interaction and motion monitoring data.
- Surface monitoring when used only for setup verification or when not modifying the radiation delivery (i.e., passive observation without real-time delivery control).

INDICATIONS

The treating physician should determine the appropriateness of AMM based on their expertise and patient-specific factors in each clinical case.

AMM is most appropriately applied when respiratory or physiologic motion clinically affects target position and/or the ability to maintain the sparing of OARs or reduce harmful doses to healthy tissues/organs. Examples may include (non-exhaustive):

- Thoracic tumors (e.g., lung, mediastinum, chest wall).
- Upper abdominal tumors (e.g., liver, pancreas, stomach).
- Breast cases where DIBH or other AMM techniques are used for cardiac and/or normal tissue sparing (e.g., breast/chest wall with regional nodes; partial breast, breast boosts).
- Prostate where AMM is used for intrafraction tracking of fiducial markers via triggered imaging with beam gating/interruption tied to the tracked position in real time.
- Cases of anticipated or observed intrafraction motion due to patient specific factors causing non-compliance (e.g., neurological conditions, psychological conditions such as claustrophobia or anxiety, etc.)

DOCUMENTATION

Documentation should clearly establish that AMM criteria are met and should be sufficient and clear for a third-party reviewer to understand both the clinical need and the AMM workflow used for prior authorization approvals. Suggested documentation should include at least one of the following elements, as applicable:

1. Clinical rationale/medical necessity for AMM for the individual patient.
2. AMM method and technology used (e.g., identify the specific system and whether gating and/or adaptive modification is performed).
3. AMM parameters/workflow, including monitoring method, thresholds/tolerances, and what constitutes an out-of-tolerance event which will lead to beam interruption or stopping altogether.
4. How motion data are acquired and reviewed during treatment and how staff are alerted to deviations.
5. Beam control methodology (beam-on/beam-off criteria and/or adaptation logic/commands).

** Documentation used for image guidance (CPT 77387), which requires review and approval by physician of images taken prior to the start of the next treatment fraction, is separate.*

CODING INFORMATION

CODE	DESCRIPTOR/DEFINITION
77412	Radiation treatment delivery, level 3 multiple isocenters with photon therapy (e.g., 2D, 3D, or IMRT) or a single isocenter photon therapy (e.g., 3D or IMRT) ***with active motion management, or*** total skin electrons, ***or*** mixed electron/photon field(s), including imaging guidance, when performed.

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