

Swallowing of saliva and eating and drinking

Manual to the F.O.T.T. algorithm developed by Trine Schow and Daniela Jakobsen

1) Goal

Set a goal for the patient (if possible together with the patient) that can be reached within the nearest future – one or two weeks. The goal should be concrete and measurable.

2a) Activity

If possible the intervention should always be related to a context from every-day life or end up with an activity related to swallowing or eating and drinking

The activity must be:

- Related to the goal
- Known and meaningful for the patient

2b) Environmental factors

General principles for selection of environmental factors:

- They should be adapted to the patient and the task enabling the patient to reach the goal
- They should support the patient to use the affected side of the body and move as normal as possible and if relevant expand the patients movements repertoire
- Furniture/objects/aids should make the activity possible to complete and make the patient able to learn new movements and movement patterns
- They should be arranged in a way so the patient has to use more normal ways (often also with support of the therapist) instead of using already established habits that are not very supportive

2b1) Adapt location:

Criteria for choosing location:

- A known place: Can provide confidence and safety to the patient that don't respond very well in new situations
- A unknown place: Can expand the patients repertoire and limit the use of old habits obstructing learning and normal movements
- Related to the activity: Provide surroundings to the patient that has problems with understanding the activity or could be good for patients who can participate in more complex activities such as, eating in the kitchen or the dining room.
- Not-related to the activity: Patients who cannot carry out or participate in a complex activity. The patient are confined to the bed, or can "understand" the activity even though it does not take place in relevant surroundings (e.g. his own room)
- In a niche (e.g. the patient are positioned in a corner against a wall or lying/sitting on the floor): The patient has perceptive or senso-motorical problems, disturbed body-scheme, disturbed balance, or reduced attention to the affected side

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- Out in the room: Patient that do not have the problems mentioned above and you may need to be able to move freely around the patient or have a plank bed or couch behind the patient
- A location where the patient are alone or shielded: To patients who easily becomes distracted, needs a lot and/or individual support
- Group situations: To patients who needs to learn to coordinate eating and talking when interacting with others. The patient can suffer from problems with tolerating others and visual stimulation in situations with several people present

2b1) Adapt furniture's:

- The furniture can be essential to support and encourage a good position and postural control. They should support the patient to move selectively and normally during the treatment. Moreover they should give sufficiently support to enable the patient to sit upright against gravity, and to move actively carrying out the activity. If the furniture supports the patient too much the patient can become or remain passive. A secure active position will support the patient to achieve new experiences in movement and tactile input in relation to the body scheme and the activity (treatment)
- For example: a stool with extra long legs will support a tall person better. It will support the pelvis to tip anterior and help the patient to come forward to the table. Using an adjustable table that can be set so the patient's trunk, shoulders and head and neck will be in alignment.

2b1) Adapt objects:

- Each object has to improve normal and active movements and movement-patterns (for example: You choose a normal glass instead of an instable plastic-cup. If the patient has senso-motorical problems that make it difficult for him to grasp and let go.

2b1) Use of aids if:

- The movement is not possible for the patient; maybe because of an amputated arm
- They can support a movement to become more selective and make it possible for the patient to involve the affected side of the body (for example a thicker grip on the knife and fork if the patient has reduced mobility in the finger joints)
- They can support that the patient perform the activity or movement more normally. E.g. a Heidi cup can be used if the patient has difficulties stabilizing the lower lip when he drinks or due to ataxia has difficulties dosing liquid from a glass

2c) Therapeutic intervention

2.c.1. Working levels for oral-stimulation (preparation to eating and training of swallowing of saliva

1. Oral-stimulation – primarily performed by the therapist

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Criteria

- When the therapist will investigate the patient's reaction to touch in face and mouth
- When the patient shows low arousal
- When the patient reacts hyper/-or hypo-sensible to touch in face and mouth
- When the patient has abnormal tonus in the face, mouth, tongue or jaw-muscles
- When the patient has decreased frequency or quality of swallowing
- When a patient cannot participate in oral stimulation actively. (Note: The patient must always be involved as much as possible)

2. Oral-stimulation with more involvement of the patient:

Criteria

- When the patient shows low arousal
- When the patient reacts hyper/-or hypo-sensible to touch in face and mouth
- When the patient has abnormal tonus in the face, mouth, tongue or jaw-muscles
- When the patient has decreased frequency or quality of swallowing
- When a patient takes over or can be instructed in doing parts of the oral-stimulation by him self

3. Independent oral stimulation used as a “self-training-program”:

Criteria

- When the patient reacts hyper/-or hypo-sensible to touch in face and mouth
- When the patient has abnormal tonus in the face, mouth, tongue or jaw-muscles
- When the patient has decreased frequency or quality of swallowing
- Used as a self-training program to patient who can prepare himself to eating and/or with the purpose to normalize the sensibility in the mouth and face
- This level can only be used if the patient has been thoroughly instructed in the routine of the program and the therapist must check that the patient can do it correctly

2.c.2. Working levels for eating/drinking

The therapist can begin working with food-consistencies on different therapeutic working levels when the patient has sufficiently postural control to sit upright (maybe with support of the therapist), can swallow own saliva with protection of the airway in case of aspiration (maybe with support of the therapist). In the different working levels there can be used different food consistencies depending of the patients problems. This means that thickened liquid might be the only consistency used in assisted eating or independent eating or that soft food is the appropriate consistency to used in therapeutic eating, there is not necessarily a natural progression in the choice of working levels and food consistencies.

1. Therapeutic eating:

Criteria:

- The patient has different problems in the swallowing sequence such as lack of transport movements, reduction in chewing-movements, decreased swallowing frequency and problems in the pre-oral phase
- Therapeutic eating means that the patient does not (cannot) ingest amounts of food that are relevant in relation to nutritional needs

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- The therapist can use three different food consistencies: 1. Firm food raped in gaze; 2. Puree; 3. Liquid in different viscosity

2. Assisted eating

Criteria:

- The patient can ingest a whole meal safely, though he still needs therapeutic support, like help with: positioning, adaptation of consistencies, clearing swallow and preparation of the meal.
- At this level the purpose is to make movements for eating and drinking automatic to the patient

3. Independent eating

Criteria:

- At this level the therapist wants to investigate the patient's abilities in independent eating and need of supervision for protection of airway and risk of falling

Food consistencies:

1. Puree food:

Food with a porridge and thick texture (without any lumps). It can easily be chewed and made into a bolus

Examples:

Yoghurt without pieces of fruit, mashed and blended fruit and vegetables, mashed potatoes, chocolate mousse (or other mousse without lumps, nuts etc.) thick soups etc

Used when:

- The patient can transport a homogeneous bolus and protect the airway but has difficulties with chewing, transporting a non-homogeneous bolus and protect the airway

2. Soft food

Food that can be easily chewed, is soft and easy to make into a bolus. There is no fibers in it (like asparagus or beans) does not turn into crumbs (like biscuits') does not have skin (like orange or peach) or crust (like on bread)

Example:

Bread without crust, spread (cheese spread, liver paste etc) jam, boiled potatoes, eggs, meatballs, meatloaf, tuna mousse, cottage cheese etc.

Used when:

- The patient can bite of something, can transport the food lateral in the mouth (tongue movements), chew and protect the airway

3. Firm-food

Firm-food is something that needs to be chewed and not included in the other consistencies.

Examples: bread with crust, roast etc.

Used when:

- The patient can bite of something, can transport the food lateral in the mouth (tongue movements), has enough strength to chew and handle firm food and swallow with protection of the airway

Liquid- consistencies:

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1. Thickened liquid:

Water/soft drink with thickening. These can vary from chocolate milk texture to almost puree consistency.

Used when:

- The patient has difficulties with controlling (thin liquid) in the oral phase, has sensibility problems and late swallow and clearing swallow and is thereby in risk of aspiration

2. Thin liquid:

Liquid with water consistency. Thinner than milk; like water and soft drink.

Used when:

- The patient swallows spontaneously, can hold and transport thin liquid without difficulties

3. All liquids:

All types of liquid, including sparkling water, hot and cold and sour drinks

Used when:

- The patient can control all liquids but still needs some kind of support when drinking, or needs to train to drink some liquids like sparkling water or hot drinks

2.c.3. Terapeutisk intervention

Move and position

Definition: All body parts (chest, pelvis, shoulders, head and neck and extremities) are put in an appropriate position towards each other, the surface, gravity and the activity. All starting positions should be without resistance, pain for the patient and safe (without risk of falling, aspiration or obstruction of the patients airway e.g. by pillow on the face or tube. It can be necessary to mobilize or guide the patient before positioning, because some neuromuscular, musculoskeletal and/or perceptive and cognitive problems makes it impossible or limits the possibility to bring the patient in a certain position.

Purpose:

- Regulate the tonus
- Create a basis for selective movements in the facial-oral tract area to patients with reduced postural control

Criteria of when to use of this method:

- Mal-alignment due to change in tonus
- Reduced postural control (senso-motorical problems)
- Perceptual problems
- Lack of selective movements in the facial-oral area

Criteria for evaluating the patients' response:

Signs of a too high a starting position:

The patient's tone rises inappropriate in one or more muscles / muscle-groups

- The emergence of many associated reactions when he tries to move
- Vegetative reactions: sweat, blood pressure and / or oxygen saturation in the blood falls, breathing rate increases

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- The patient is unconcentrated, facial expression/movements seems tense, the patient seems worried
- The patient has difficulty in performing movements which he can perform in a lower position

Signs of a too low starting position:

- The patients arousal falls
- The patient masters the task and moves spontaneous and selective
- The patient has no need of assistance
- The patient seems unconcentrated, because you are not working at his level, the "challenges" to his functionality is too low

Mobilization:

Definition:

Moving body parts and / or structures which do not have full range of movement

Purpose: To achieve greater range of movement (ROM), more normal tone, better proprioception, improve alignment

Criteria for use of this method:

Primarily when the patient has senso-motorical problems which gives a resistance or decreased ROM in a movement or an activity

- Mal-alignment because: Hyper / or hypo-tonus, ataxia, rigidity
- Reduce ROM (due to: ossification, hyper tone, condition after fracture, etc.).
- Abnormal sensitivity
- Impaired proprioception

Criteria for evaluating the patients' response:

Signs that mobilization has positive effects on the patient's problem:

- A movement becomes possible, easier
- ROM is increased
- Better alignment
- The patient can better feel the mobilized body part / or uses it
- The patient can move actively

Signs that the mobilization does not have the desired effect on the patient's problem:

- The patient shows signs of pain
- No change or worsening in Rom, alignment and the possibility of moving
- No change in sensitivity or proprioception

Guiding:

Definition: The therapist supports the patient's normal movement / movement patterns in an activity

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Purpose:

Bringing the patient into contact with the surroundings and forming hypothesis and problem-solving processes. Moreover to perform movements that he cannot do by himself.

Criteria for use of this method:

- The patient cannot perform a movement or an activity because of perceptive, sensorimotorical or cognitive problems
- The patient performs the movement / activity, but only in stereotypical movement patterns without variation or only by using the non-affected body part / limb

Criteria for evaluating the patients' response:

Signs that guiding has positive effect on the patient's problem:

- The patient becomes aware of the activity or the movement
- The patient takes over the movement and / or pursuing the next action steps
- The patient can initiate and repeat the guided movement independently
- The Patients tone normalizes
- The patient's motor behavior is changes

Signs that guiding does not have the desired effect on the patient's problem:

- The patient is not attentive towards the activity or movement
- Patients tension rises
- The patient becomes restless
- There is no change in behavior

Facilitation:

Definition: Facilitation is a technique where you most often through manual contact activate the sensory and proprioceptive afferent system. Facilitation is an active learning process that helps a person to overcome inertia, initiate, to continue and complete functional tasks. Facilitation is never passive. The therapist can choose to facilitate the patient at all times to either maintain postural control and / or perform selective movements in tasks and activities in the facial-oral tract area. The location, direction of and intensity of facilitation may vary.

Purpose:

- Makes an activity possible, change motor behavior and ease movements

Criteria for using which level:

1. All the time

Used when:

- The patient loses postural control at the moment the therapist takes "hands off"
- The patient doesn't have the idea or ability to use the movements or to initiate, conduct and/or complete a movement or activity
- Selective movements become mass movements

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- The patient has associated reactions
- The quality of the movements becomes worse when therapeutic take "hands off"

2. Partly / in between movements, movement patterns or activities

Used when:

- The patient can retain postural control and will not lose it over a shorter period
- The patient begins to take over, initiate or terminate a movement / action / activity spontaneously with sufficient quantity and quality

3. To initiate movements, functions, activities (i.e. only in the beginning)

Used when:

- The patient has adequate postural control and can take over and complete a movement / function / activity / task
- The patient can move spontaneously, selective in the facial-oral tract area and can achieve the goal in the required quantity and quality

Criteria for evaluating patient response:

Signs that facilitation has a positive effects:

- Change of motor behavior (the patient becomes active and the movement becomes easier)

Signs that facilitation don't have the desired effect:

- The patients tonus increases
- Motor behavior did not changed
- The patient is passive

Elicit (produce)

Definition: Elicit means to generate a response or reaction from the patient by, for example the therapist acts as a visual model, instead of encouraging the patient directly to perform the activity or movement.

Objective: To induce a movement / function / activity

Criteria for use of the method:

- The patient has no language understanding
- The patients tonus increases when he tries to follow the verbal requests and there are associated reactions
- The patient has trouble understanding the situation

Criteria for evaluating patient response:

Signs of eliciting has the desired effect

- The patient is active and performs the desired movement / function / activity

Signs of eliciting don't have the desired effect

- The patient tonus increases
- The patient does not respond or respond differently than expected

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2.c.4 tongue movements

Main reasons to activate the patient's tongue or work with tongue-movements:

1. Reduced tongue mobility, both inside and outside the mouth
2. Reduced or increased sensitivity and sensibility (increased sensitivity can be seen if the patient bites, has hyper-extensive gag-reflex or reacts with increased tonus when touching his tongue)
3. Decreased swallowing rate and problems in the oral and pharyngeal phase (problems with transport movements)
4. Problems with articulation

1. Tongue is being moved by the therapists when:

- The patient is unable to move his tongue or have reduced mobility in the tongue
- The patient does not have an idea about how or why he should move the tongue
- The patient cannot find a tactile goal with his tongue (e.g. Straws) outside the mouth, but has no problems moving the tongue. By moving the tongue the therapist can "guide" the patient's tongue, and thereby provide him with an experience of how to use the tongue

2. Therapists move the tongue to one or more positions, the patient holds the position and moves the tongue back again

- The patient's tongue shows incipient activity and there is reduced sensibility in the mouth
- The therapist will examine whether the patient can move the tongue actively after the tongue has been received some input through movements

3. The patient is actively moving the tongue to a goal

- The patient can move the tongue actively, however, either with reduced ROM or lack of selectivity
- The patient's tongue mobility and reaction to contact should be examined
- Decreased sensibility in the mouth

4. The patient moves the tongue and repeats the movements in the functional context:

- The patient can move the tongue actively
- Has reduced sensibility
- The patient cannot use the movements in a functional context such as transportation or articulation where he needs to coordinate the movements of e.g. soft palate, cheeks, lips and head. An exercise would be that the patient must transport some gauze placed in the cheek out of the mouth or remove some yogurt placed on the lips or corner of the mouth
- When the patient is unable to perform abstract movements, e.g. placing the tongue on the end of a straw, but can find the movement when it is required e.g. when removing rests of food in the mouth

NOTE: "Repetition" in this context means to train or elicit movements and movement patterns in different contexts / activities. Repetition must be adapted to the task and the patient's problems to enable motor learning

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2.c.5 Therapeutic support for the protection of airway

Used when:

- The patient during treatment shows signs of penetration / aspiration and silent aspiration shown by rattle sounds in breathing, coughing, and clearing the throat
- It should be noted that there is no specific way to train to cough or clear the throat

Support for coughing

- When the patient coughs ineffectively (weak cough, extension pattern, lack of clearing swallowing)

Can be supported using the following options:

- Bringing the patient forward
- Supporting ribs costal and sternum (possible the stomach)
- Avoid the patient ingest food or drink before making sure that he has free breathing
- Facilitate clearing swallow or spitting out

Support the patient to clear the throat when:

- The patient has an ineffectively clearing of the throat
- The patient has a wet voice and does not respond to it by clearing the throat (slight coughing)

Can be supported using the following options:

- Bringing the patient forward
- Support the costal and sternum (possibly the stomach)
- Avoid the patient ingest food or drink before making sure that he has free breathing
- Facilitate clearing swallow or spitting out
- The therapist acts as a "model" doing by demonstrating how to 'clearing the throat' possibly together with vibrating on the patient's sternum to force expiration

Support clearing swallow

Used when:

- The patient has coughed, cleared the throat or eats without using a secondary clearing swallow
- Clearing swallows comes very late or is ineffective

Can be supported using the following options:

- Stabilizing the jaw
- Providing tactile support to swallowing by the floor of the mouth
- Moving the patient
- Force the expiration and / or prolong the expiration phase (time)

Support the use of the voice

Used when:

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- The patient shows clinical signs of penetration of saliva or food / drink.
Can be facilitated or elicited by:
 - Vibration or pressure at the ribs or sternum
 - Maybe by support at the stomach
 - The therapist can demonstrate how the patient should do by using own voice or try to produce or induce a comment or an answer from the patient that is related to the context

Support to cleaning the mouth

Used when:

- The patient has residues or bits of food / drink in the mouth and does not have the senso-motorical ability to remove it.

Can be supported by:

- Support the patient to feel the residue and swallow them or spit them out
- If the patient cannot be activated to swallow or spit out, the therapists removes material with gauze on the finger
- Support the patient to collect the remains with the tongue and either transport it to swallow or spit it out
- If the patient cannot be activated to collect remains of the tongue or spit out, the therapists remove material with gauze on your finger
- If secretions or mucus is so viscous or as large a quantity that it is inappropriate to swallow it should also be removed with gauze
- In special cases, it is recommended that the material is sucked out with a tube by a nurse, for example after vomiting.

Support 'to come forward'

Used when:

- It will prevent the patient from aspiration in the a treatment or eating situation or when the patient already has aspirated/penetrated
- Moving/leaning forward is part of the physiological protection mechanisms during normal eating and in case aspiration / penetration. Patients with extension-pattern or the patient due to lack of postural control has lost the ability to come forward. This applies both lying, sitting and standing positions.

3. Evaluation

The treatment should be evaluated by the nature of the patient's response. By answering the question:

Does the patient perform the activity in a more normal way / in better quality? The question can be answered with yes or no. Whatever the answer, the therapist must adjust the treatment immediately. When adapting the treatment the therapist must always remember to change only one parameter at a time to evaluate what action is causing the effect. Even if you have a plan and the patient reacts unexpected, with e.g. pain, vomiting, then it is important to respond to patient needs and not continue the intervention.

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4a. If the answer is YES, you have three options:

- Give less support (Important is only to change one element at a time in order to be able to evaluate the patients responds and let the patient repeat the same task)
- Increase requirements / the scope of the activity with use of the same level of support and see how the patient responds
- Set a new goal in the same or another F.O.T.T. area

NOTE: The quality or quantity parameters should not be exacerbated so there appear associated reactions or mass movements when reducing the support

General principles of how to increase the demands and give less support:

Level of the activity:

- Include more sub-actions / elements
- Increase the requirements to selectivity, normal movement, ROM
- It shall be carried out faster, over a longer time, with more repetitions of one or several elements

Level of the surroundings:

- Room and location should be more “normal” and not be individually adapted
- The activity should be in another context that is new to the patient
- Surroundings should change, there should be more stimuli, sounds, and presence of other persons etc
- No special objects
- No aids

Level of therapeutic support:

- The patient is facilitated on a lower level, for example. only partial instead of constant
- The therapist chooses to bring the patient in a higher starting position or decrease the support in the position he already has

4.a If you answer NO, then you have three options:

- To change the activity so that it demands less of the patient
- Give more support, this may also imply that the therapist changes approach because the patient cannot use the information / help he has received so far (e.g.: the therapist uses guiding instead of facilitation)
- Set a new goal, because the goal was chosen proves to be too high / unrealistic or the patient's needs have suddenly changed

General principles of how to reduce demands and provide greater support:

Level of the activity:

- Include fewer sub-actions / elements
- Reduce the requirements to selectivity, normal movement, ROM

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- It shall be carried out more slowly, over a shorter time, with fewer repetitions
- Choose a more familiar task

Level of the surroundings:

- Room and location will be individually (more) adapted
- The activity will be performed in another, more recognizable / familiar context to the patient
- The patient must perform the task in a room with fewer stimuli, without the presence of other persons
- The furniture will be adapted to support the patient more
- use special items
- Use aids

Level of the therapeutic support:

- The patient is facilitated on a higher level, for example. constant instead of only partial
- The therapist chooses to bring the patient in a lower starting position or increase the support in the position he already has (e.g. supporting both head with jaw control grip and also the patient's trunk)

4 b) Improvement?

After having launched new / changed actions, you need to evaluate again the patient's response and re-adjust the treatment depending on the patient's response, with either more or less support. This process continues until this treatment-intervention is over.

5) Evaluation of the goal

When the intervention is over you evaluate whether the goal for treatment has been reached and if you wish to work with this goal in further treatment sessions. At the same time you can establish a strategy for the next treatment with basis in the techniques, methods which have proved to be appropriate for the patient in this intervention.