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A patient who undergoes/has undergone maxillofacial surgery is already under enormous apprehension and fear. Postoperative physical and mental stress because of depression, shock, anger and ostracisation add to functional and esthetic impairments and all these make the sufferer prone to malnourishment. An approach that involves simple nutritional principles preceding the surgery, continuing postoperatively and proceeding life long will translate into improved prosthodontic prognosis. We have attempted to apply these principles to solve the common nutritional problems affecting maxillofacial prosthetic patients, keeping in focus the diet and economics of a normal Indian patient.

Key words: Malnutrition, maxillofacial, nutrition prognosis

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**Table 1: Assessment of body fat as indicated by the 5th and 50th percentile of triceps skin-fold thickness (mm) by frame size and gender in an age group of 25-74 years**

<table>
<thead>
<tr>
<th>Frame Size</th>
<th>5th Percentile</th>
<th>50th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Men</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Medium Men</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Large Men</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>Small Women</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Medium Women</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Large Women</td>
<td>16</td>
<td>32</td>
</tr>
</tbody>
</table>
Table 2: Assessment of muscle mass as indicated by the 5th and 50th percentile of mid-arm muscle area by frame size and gender (cm²)

<table>
<thead>
<tr>
<th>Age</th>
<th>Small frame</th>
<th>Medium frame</th>
<th>Large frame</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5th</td>
<td>50th</td>
<td>5th</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-54</td>
<td>42</td>
<td>55</td>
<td>49</td>
</tr>
<tr>
<td>55-74</td>
<td>37</td>
<td>55</td>
<td>46</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-54</td>
<td>26</td>
<td>33</td>
<td>28</td>
</tr>
<tr>
<td>55-74</td>
<td>26</td>
<td>35</td>
<td>29</td>
</tr>
</tbody>
</table>

gm/dl may indicate a mild degree of malnutrition, whereas a count of 3.0 gm/dl or less may indicate severe malnutrition.[5]

Anthropometric and laboratory measurements are useful; however, the basis of nutritional assessment rests on history and physical examination[6] which therefore should be emphasized. Based on these assessment results, the indications for additional nutritional support are as follows:[6]

- Poor preoperative nutritional status (oral intake is less than 50% of the total energy requirement),
- Significant weight loss (body weight is less than ideal by more than 10%),
- An anticipated duration of Nil per orally for more than seven days (indicated particularly for total parenteral nutrition (TPN)) and
- Serum albumin values less than 3.0 gm/dl.

The patient is then categorized into ambulatory or nonambulatory; with maintenance diet or anabolic diet, respectively; subsequently, the caloric and protein requirement can be calculated by using various formulae and equations.[2,7] The Harris-Benedict formulae are preferred because of its simplicity [Table 3].

### POSTOPERATIVE PHASE

In this phase, the utilization of the oral cavity for feeding may be hindered by the adverse effects of chemotherapy or radiotherapy or by the resection itself. Alternatives to oral feeding are nasogastric intubation, TPN, gastrostomy or jejunostomy.[8] If oral feeding can be resumed within a week of surgery, nasogastric intubation is indicated. In patients not expecting resumption around a month, TPN is preferred and gastrostomy/jejunostomy is indicated where long-term nil per orally is expected or in patients with swallowing disorders. The clinical uses with the complications of various extraoral routes of nutritional administration are summarized in Table 4. Once oral feeding is resumed, malnutrition is the common postoperative sequelae due to various complications; it is discussed with the possible solutions as follows:

- Loss of appetite may be caused by aguesia, xerostomia, mechanical dysphagia, depression or anger.[9] The possible solutions are as following:
  - Eat small amounts four to six times daily rather than three big meals.
  - Drink easy to swallow nutritious fluids like soups, milk shakes and curd.
  - Psychological counseling.
  - Sore mouth may be caused by xerostomia and mucositis (due to depressed epithelial cell division).[9] This may be tackled by:
    - Avoiding salty or spicy food or food with rough texture.
    - Taking soft nonacidic, blended or liquid foods such as custards, pureed meats and cottage cheese.
    - Leaving dentures as long as possible out of the mouth (tissue rest).
  - Diarrhea may occur secondary to radiotherapy or antibiotic therapy, infection or decreased masticatory ability.[10]
    - If diarrhea is caused by radiotherapy, antidiarrheals (prescribed by oncologist) may be necessary.
    - Drink plenty of fluids to replace the loss of water and electrolytes (oral rehydration therapy).
    - Have curd and bananas regularly.
    - Regular consultation with the physician.
  - Xerostomia may be caused by radiation therapy and drugs, severing of salivary duct and gland (accidental or intentional), decreased liquid intake or stress and anxiety.[9]
    - Frequent liquid intake helps to keep the mouth moist.
    - Tongue coating (due to xerostomia) impairs the taste. To overcome this, clean the tongue two to three times daily with a bicarbonate soda solution.
    - Avoid sticky foods such as chocolates and pastries (cariogenic).
    - Use artificial salivary substitutes.
    - Boiled sweets stimulate saliva production.
  - Constipation could be caused by lack of fiber in diet, stress and anxiety, muscle weakness or drugs.[10]

### Table 3: Basal metabolic rate determined by Harris-Benedict equation

| BMR (male) | (66 + (13.7 × weight in kg) + (5 × height in cm) + (6.8 × age in year)) | (4.7 × age in year) |
| BMR (female) | (655 + (9.6 × weight in kg) + (1.7 × height in cm) + (1.7 × age in year)) | (4.7 × age in year) |
| Calorie requirement | BMR × AF × IF | Ambulatory BMR 1.3 |
| Protein requirement | 6.25 × cal. required/150 | |
| Activity factor (AF) | Lying in bed BMR 1.2 | |
| Injury factor (IF) | Maintenance 0-30% | Anabolic 40-60% |

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Induct fibers (roughage) in diet; good sources include whole-wheat cereals, whole-wheat breads, green vegetables, etc.

- Natural remedies for constipation includes figs, papaya and drinking eight to ten glasses of water in copper utensils.[11]

**CONCLUSIONS**

Malnutrition is a reality that a maxillofacial prosthetic patient may face throughout his life; its causes vary from depression to functional impairment. As part of the rehabilitation team of such a patient, it is the duty of a prosthodontist to be aware of the significance of nutrition, recognize signs and symptoms of malnutrition, manage simple nutritional problems and refer the patients to competent personnel, if required. Adopting such an approach would improve the prognosis of both the patient and prosthesis.

**REFERENCES**


**Table 4: Clinical uses C the complications of various extra oral routes of nutrition administration**

<table>
<thead>
<tr>
<th>Feeding technique</th>
<th>Clinical use</th>
<th>Potential complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasogastric tube</td>
<td>Short-term clinical situations (weeks) or longer periods with intermittent insertions</td>
<td>Aspiration; ulceration of nasal and esophageal tissues, leading to stricture</td>
</tr>
<tr>
<td>Gastrostomy tube</td>
<td>Long-term clinical situation, swallowing disorders or impaired small-bowel absorption requiring continuous drip</td>
<td>Aspiration; irritation around tube exit site peritoneal leak</td>
</tr>
<tr>
<td>Jejunostomy tube</td>
<td>Long-term clinical situation where impaired gastric emptying</td>
<td>Clogging or displacement of tube; jejunal fistula if large tube is used; diarrhoea</td>
</tr>
<tr>
<td>Total parenteral nutrition</td>
<td>Immediate postoperative phase; obstruction of GIT; impaired swallowing</td>
<td>Mechanical - thrombus, embolism; metabolic - fluid and electrolyte derangement; infections - catheter-induced sepsis, exit-site injections.</td>
</tr>
</tbody>
</table>

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