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QUALITY OF LIFE AFTER NECK DISSECTION FOR ORAL CANCER: AT A TERTIARY CARE CENTER EXPERIENCE USING THE DASH INDEX AND UW-QOL QUESTIONNAIRE: A PROSPECTIVE STUDY OF 100 CASES.

Dr Mrinal Das[1], Anand Mohan[2], Dr Dinesh Yadav[3], Dr Nitin Khunteta[4], Dr Sanjay Sharma[5], Dr Raj Govind Sharma[6], Dr Neha Sethi[7], Dr Samarth V Dave[8], Dr Mohinder Viswanath[9], Dr Abhilash Madhaban[10], Dr Swapnil Vanparia[11], Dr Deepak Samane[12]

[1]Mch Resident, Dept. of Surgical Oncology, Mahatma Gandhi Medical College and Hospital, Jaipur (Rajasthan) India

[2]Assistant Professor, Dept. of Surgical Oncology, Mahatma Gandhi Medical College and Hospital, Jaipur (Rajasthan) India

[3] Professor, Dept. of Surgical Oncology, Mahatma Gandhi Medical College and Hospital, Jaipur (Rajasthan) India

[4]Associate Professor, Dept. of Surgical Oncology, Mahatma Gandhi Medical College and Hospital, Jaipur (Rajasthan) India,

Corresponding author, email id: onconitin@yahoo.co.in

[5] Professor, Dept. of Surgical Oncology, Mahatma Gandhi Medical College and Hospital, Jaipur (Rajasthan) India

[6]Proffessor & HOD, Dept. of Surgical Oncology, Mahatma Gandhi Medical College and Hospital, Jaipur (Rajasthan) India

[7]Associate Professor, Department of pathology, Mahatma Gandhi Gandhi Medical College and Hospital, Jaipur (Rajasthan) India

[8,9,10,11]Mch Resident, Dept. of Surgical Oncology, Mahatma Gandhi Medical College and Hospital, Jaipur (Rajasthan) India

ABSTRACT:

Neck dissections are routinely performed along with Squamous cell carcinoma of Oral cavity either as staging procedure or therapeutic procedure. However, it causes more morbidity in terms of shoulder mobility as more radical neck dissections are done.

The purpose of this study is to evaluate morbidity associated with neck dissection for oral cancer, comparing the outcomes in relation to preservation of different anatomical structures in four subsets of patients–viz. 1. Radical Neck Dissection (RND) 2. Modified Radical Neck Dissection (MRND) with nerve preservation (spinal accessory nerve) 3. MRND with nerve sacrifice 4. Selective Neck Dissection (SND). The quality of life scores were generated using the DASH Index (Disabilities of Arm, Shoulder and Hand) and UW-QOL questionnaire (University of Washington Quality of Life Questionnaire). The range of motion for shoulder and neck evaluated using a self-designed performa, comparing the outcomes between different subsets.

100 patients with Squamous cell carcinoma of Oral cavity who underwent surgery for primary lesion and neck dissection (RND, MRND or SND) were enrolled in prospective manner from 01/01/2021to 12/12/2021 at our institute in this study.

Patients were trained for exercises of neck and shoulder by physiotherapy team, each session lasting 30 minutes and evaluated using DASH Index and UWQOL Questionnaire at one month, three months and six months. The shoulder active range of motion (AROM) were quantitatively measured using a Goniometer and compared with that of non-operated side.

In our study, shoulder complaints were reported by 66.6% percent subjects in RND group, 56% in MRND group I (nerve not preserved), 12% in MRND group II (nerve preserved) and 4% percent in SND group. In our study, the mean range of motion for lateral abduction was 163 degrees in RND group, 165 degrees in MRND group I, 170 degrees in MRND group II and 173 degrees in SND group. The range of forward flexion was 164 degrees in RND group, 166 degrees in MRND group I, 169 degrees in MRND group II and 176 degrees in SND group. These results are better than found in review of literature.

Key Words: DASH: Disability of Arms, Shoulder and Hand, **UWQOL:** University of Washington Quality of Life Questionnaire**, RND:** Radical Neck Dissection, **MRND:** Modified Radical Neck Dissection**, SND:** Selective Neck Dissection**, AROM:** Active Range of Motion

INTRODUCTION:

Over the last few decades, the procedure of neck dissection has evolved from radical neck dissection (RND) to conservative, though for advanced stage disease, the former is still respected as the "gold standard".[1] Functional, selective neck dissection (SND) and modified radical neck dissection (MRND) have been proposed in view of decreased long term morbidity and better quality of life in relation and to evaluate survival results.[2,3] Various scales and questionnaires have been described in the literature for assessment of quality of life in relation to postoperative discomfort after neck dissection – such as the Disability of Arms, Shoulder and Hand (DASH) Index, Constant Shoulder Scale,[4] UWQOL (University of Washington Quality of Life Questionnaire),[5] EORTC H & N 35,[6] etc. One of the indices for assessment of quality of life following neck dissection is the DASH Index. A 10-item derivative of DASH Index for assessment of patient's response in relation to various difficulties associated with upper extremity or shoulder has been used in various studies for grading quality of life after neck dissection in relation to disability of shoulder function.

At our department of Surgical Oncology in a tertiary care cancer centre, we conducted a prospective observational study to evaluate quality of life after neck dissection who underwent surgery from 01/01/2021to 12/12/2021 using the DASH Index and UWQOL Questionnaire. In order to evaluate the relationship of other covariates in relation to discomfort and pain perceived by the patient, data was collected on patients' age, weight (and BMI), radiation treatment and type of neck dissection (SND vs MRND vs RND), as these are known to be important factors that affect quality of after neck dissection.[7] After completion of treatment, patients were asked to fill the DASH questionnaire and the UWQOL questionnaire. The cumulative results obtained from scoring in both questionnaires were used to plot the final outcome values.

MATERIALS AND METHODS:

A sample of 100 patients treated for oral cancer, who underwent Neck Dissection (RND, MRND or SND) from 01/01/2021to 12/12/2021 at our institute, were selected for the study.

Inclusion criteria:

- Patients suffering from squamous cell carcinoma of oral cavity, presenting with early or advanced stage of disease, were included in the study.
- Patients of both sexes, all ages were included.
- Patients who underwent postoperative radiotherapy, chemotherapy or concurrent chemoradiation were included.
- Patients treated by primary surgery without any history of preoperative radiotherapy, chemotherapy or previous surgery.
- Patients without distant metastasis.

Exclusion criteria:

- Patients presenting with recurrence after previous surgery.
- Patients with history of preoperative radiotherapy, chemotherapy or previous surgery.
- Patients with previous history of ipsilateral shoulder disorder.

The present study is a prospective observational study of patients who underwent neck dissection for oral cancer. All patients were operated by a single surgeon. The first 20 items in response scale of DASH Index (Disabilities of Arm, Shoulder and Hand) were used to grade the patients' response in relation to postoperative quality of life after neck dissection. Thereafter, patients were made to complete the updated version (version 4) of University of Washington Quality of Life Questionnaire (UWQOL). Scores on both questionnaires were tabulated and correlated with additional data regarding patient's age, radiation treatment and type of neck dissection (SND or MRND; spinal accessory nerve spared or not spared), as these factors are known to affect quality of life after neck dissection. After neck dissection, patients were trained for physiotherapy exercises of neck and shoulder by PMR department physiotherapy team. The physiotherapy protocol consisted of 9 exercises as described by Baggi et al[8], except for additional exercises in section of shoulder abduction (shoulder abduction was gradually progressed to wall climbing or finger ladder exercises in standing position followed by active abduction in standing position) as suggested by Thomas et al[9]. Patients were instructed about method of exercises by Physiotherapy Team, each session lasting 30 minutes. These were as follows: Physical Therapy Brochure described the nine exercises to be performed:

a) relaxation through deep breathing in a supine position for three minutes;
b) flexing the arm completely in a supine position, while supporting the body with the opposite arm;
c) complete abduction of the arm, not against gravity, in the supine position; this was gradually progressed to wall climbing or finger ladder exercises in standing position followed by active abduction in standing position.
d) rotating the head to the left and right in the sitting position;
e) tilting the head to the left and the right, in the sitting position;
f) flexing and extending the head back and forth, in the sitting position;
g) raising and lowering the shoulders, in the sitting position;
h) moving the shoulders backwards and forward, in a sitting position; and
i) holding a stick in front of the body parallel to the ground with both hands, then raising it above the head and taking it to the nape of the neck while flexing the elbows.

The shoulder active range of motion (AROM) was quantitatively measured using a Goniometer and compared with that of non-operated side.

Presence of other confounding factors or comorbidities such as diabetes mellitus, hypertension, hypothyroidism, cardiac disease (such as history of PTCA, MI, Stroke, etc.) was studied for association with quality of life and time taken for recovery.

ANALYSIS:

Patients completed the DASH Index, with scores ranging from 0 to 100 and higher scores indicating better shoulder functioning and shoulder-related quality of life. The DASH scores were compared for RND vs MRND vs SND to know differences in outcomes for accessory nerve-sparing neck dissections. Patients were asked to report on their adherence to physiotherapy schedule as advised. The MRND Group was sub-classified into MRND Group I (spinal accessory nerve not preserved) and MRND Group II (nerve preserved). Also, compliance to shoulder abduction greater than 90 degrees was measured and recorded. The shoulder AROM was tabulated at each follow-up visit. Thereafter, patients completed the UWQOL questionnaire. Scores of both questionnaires were summed up to retrieve final outcomes.

SPSS version 21 was used for statistical analysis. Mean, median and range were calculated for DASH scores, UWQOL scores and overall scores (sum of both scores). Linear regression was done to adjust for confounding factors and Multivariate regression analysis was done to extrapolate the association of quality of life outcomes with various covariates such as patient's age, weight and BMI, radiation and / or chemotherapy and type of neck dissection (SND or MRND; spinal accessory nerve spared or not spared).

RESULTS:

TABLE I:

S. N.	Age group	Number of patients
1	71-80	8 (8 %)
2	61-70	12 (12 %)
3	51-60	24 (24 %)
4	41-50	46 (46 %)
5	31-40	8 (8 %)
6	21-30	2 (2 %)
	Total patient	100

TABLE II:

Serial number	Clinical Stage	Number of patients
1	Stage I	6 (6 %)

2	Stage II	24 (24 %)
3	Stage III	48 (48 %)
4	Stage Iva	22 (22 %)

On linear regression, we identified that patient age, adjuvant radiation and / or chemotherapy, reconstruction procedures, stage of primary disease, extent of neck dissection has significant association with QOL after ND for oral cancer. However, on multivariate analysis, only stage of primary disease and type of neck dissection (RND vs MRND vs SND) were predictable risk factors for QOL after neck dissection. Among the patients, 46% fall in age group of 41to 50 and 24% fall in age group of 51to 60 years. Forty-eight percentage of patients belong to clinical stage III and almost equal percentage of patients belong to clinical stage of II and IVa.

We employed a standard protocol of physiotherapy, commencing at 2 weeks after surgery, in all patients. 92% of our patients reported improvement in the shoulder AROM after adhering to the physiotherapeutic exercise schedule. In every patient of our study cohort, the ipsilateral shoulder AROM was compared to that of non-operated side. Only 6% of our patients reported pain in shoulder and neck, requiring medication beyond 2 months. None of the subjects required opiates for pain control.

TABLE III: ROM-LATERAL ABDUCTION

Group	No. of patients	One month	Three months	Six months
RND	4 (4%)			163
MRND 1-Nerve preserved	28 (28%)	118	114	165
MRND 2-Nerve not preserved	63 (63%)	135	130	170
SND	5 (5%)	148	151	173

TABLE IV: ROM-FORWARD FLEXON

Group	No. of patients	One month	Three months	Six months
RND	4(4 %)	131	122	164
MRND 1-Nerve preserved	28 (28%)	130	127	166
MRND 2-Nerve not preserved	63(63%)	140	135	169
SND	5(5%)	141	148	176

In our study, the mean range of motion of ipsilateral shoulder for lateral abduction was 163 degrees in RND group, 165 degrees in MRND group I, 170 degrees in MRND group II and 173 degrees in SND group. The range of forward flexion was 164 degrees in RND group, 166 degrees in MRND group I, 169 degrees in MRND group II and 176 degrees in SND group.

TABLE V: SCORE OF QUESTIONNARIES:

	RND (4%)	**MRND 1(28%)**	**MRND 2(63%)**	**SND(5%)**
DASH Total Score -100	82	96.08	98.17	99
UW-QOL Total Score-1500	1266.7	1387.7	1421.25	1446.5

The mean DASH score was 82 for RND Group, 96.08 for MRND Group I, 98.17 for MRND Group II and 99 for SND Group. The mean UWQOL Score was 1266.7 for RND Group, 1387.8 for MRND Group I, 1421.25 for MRND Group II, 1546.5 for SND Group.

TABLE V: SHOULDER DROOPING

Group	**No. of patients**	
RND	4(4%)	100%
MRND 1-Nerve preserved	28(28%)	92%
MRND 2-Nerve not preserved	63(63%)	4%
SND	5(5%)	0%

59% of patients in MRND group underwent sacrifice of the spinal accessory nerve and sternocleidomastoid nerve (MRND Group I). Shoulder drooping was identified in 100% of patients in RND group, 92% of patients in MRND group I (nerve not preserved), 4% of patients in MRND group II (nerve preserved) and zero percent of patients SND group.

DISCUSSION:

Imai et al[13] (2020) conducted a study to assess shoulder function after neck dissection. This study included a prospective cohort of 66 patients (85 neck dissection sides) who underwent neck dissection between December 2015 and July 2017 at a single institution. The active shoulder abduction angles of the affected side and the patient-reported shoulder-specific quality-of-life recovery score of the Western Ontario Rotator Cuff (WORC) questionnaire were examined at 1, 3, 6, 9, and 12 months postoperatively. The average active shoulder abduction angles were significantly improved at 3 and 6 months postoperatively compared with 1 month postoperatively (96.5 ± 4.3° at 1 month versus 110.1 ± 4.7° at 3 months and versus 142.0 ± 4.6° at 6 months). The proportion of patients who were unable to abduct their shoulders by

150° or more was significantly lower at 6 months postoperatively (41.5%) compared with 1 month postoperatively (82.4%). The WORC score significantly improved from 60.4 ± 2.4% at 1 month postoperatively to 67.9 ± 2.6% at 6 months postoperatively. Multivariate analysis revealed that postoperative radiotherapy was a significant risk factor for shoulder impairment at 3 and 6 months postoperatively and that level V dissection and head and neck irradiation were significant risk factors for a worse shoulder outcome at 6 and 9 months postoperatively.

Chen et al[14] (2018) presented a single-arm preliminary pilot study aims to explore the effects of a six-month early intervention program following reconstructive surgery in 65 oral cancer survivors. The inclusion criteria were survival after excision of oral cavity squamous cell carcinoma (SCC) with reconstructive microsurgery, and age between 20 and 65 years old. Interventions started early after the reconstructive microsurgery. All participants underwent each component of the intervention program, which consisted of pain management, scar management, temporomandibular joint (TMJ) exercise, shoulder and neck exercise, and functional training of the donor site and recipient site to restore oral and physical function. The intervention program was divided into three phases: (1) the early phase (within 1 month after operation), (2) the middle phase (1 to 3 months post-operation), (3) and the late phase (more than three months post-operation). Scapular muscle strength and shoulder range of motion progressively improved during the 6-month follow-up. The mean Disability of the Arms, Shoulder and Hand (DASH) score showed significant improvement at 1 month ($p < .001$). Health related QoL showed significant differences between baseline and 6-months post-surgery scores on global health and on most of the function and symptom scales. The predicted return-to-work rate was 80% at one year after the operation. Return-to-work rate differs in different vocational types, with a higher rate of return in the skilled or semi-skilled (87.5%) and self-employed (86.7%).

Do JH et al[15] (2018) presented a study to compare the effects of hospital-based and home-based exercise programs on quality of life (QOL) and neck and shoulder function of patients who underwent head and neck cancer (HNC) surgery. The clinical trial included 40 patients with neck and shoulder dysfunction after HNC. Twenty patients who were assigned to the hospital-based exercise group performed physical therapy for 40 min three times a week for four weeks, and the remaining 20 patients were assigned to the home-based group. The European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC QLQ-C30), the EORTC Head and Neck Questionnaire (EORTC QLQ-H&N), the Neck and Shoulder Disability Index (NDI), ROM, and numeric rating scale (NRS) were assessed before and after the exercise program. The program consisted of a 10-minute ROM to the neck and shoulder, a 10-minute massage, and 15 min of progressive resistance exercises, followed by a five-minute stretching exercise. Home-based exercise was effective for improving QOL, shoulder function, and pain relief. Hospital-based exercise had better effects on physical function of the neck and shoulder and reduced pain.

Spalthoff et al[16] (2017) published a study that analysed the functional and psychosocial harms of neck dissection (ND), which lessens quality of life. This study included questionnaire responses from patients with oral squamous cell carcinoma (n = 1,652) and clinicians (n = 1,489), as collected in the DÖSAK Rehab Study. Functional and psychosocial outcomes in patients who did not receive ND were compared with those in patients who underwent selective supraomohyoid ND (SND), modified radical ND (MND), and radical ND (RND). The results

revealed that patients with ND had lower quality of life than those without ND. Burdens after SND (n = 923) were generally lesser than those after MND (n = 301) or RND (n = 678). There were meaningful differences between the SND, MND, RND and without-ND groups in impairments in speech intelligibility for strangers and familiar persons, ingestion and swallowing, tongue mobility, opening of the mouth, lower jaw mobility, neck mobility, and shoulder and arm movement ($P < .05$).

Gane et al[2] (2016) conducted a systematic review of literature to examine the prevalence and incidence of shoulder and neck dysfunction after neck dissection. The prevalence rates for shoulder pain were slightly higher after RND (range, 10-100%) compared with MRND (range, 0-100%) and SND (range, 9-25%). The incidence of impaired active range of motion of shoulder joint was dependent on type of surgery performed (range, 5-20%), i.e., SND vs MRND vs RND. The prevalence of reduced active range of motion in neck after neck dissection was 1-13%. Similarly, Kuntz et al[8] (1999) studied quality of life scores in 84 patients who underwent different types of neck dissection. The patients were asked to complete University of Washington Quality of Life Questionnaire (UWQOL) before treatment and after treatment, at 6 and 12 months. Shoulder function for RND group was reported as inferior to SND group at 6 and 12 months. The MRND group reported greater shoulder disability at 6 months, compared to SND group. Thus, various studies have reported different incidences of shoulder disability for patients undergoing RND, MRND or SND. The prevalence of shoulder-related complaints after MRND range from 18-77% [9-13] while after RND range from 47-100%.[13-15] The prevalence after SND has been reported to be in range of 31-40% in various studies.[16]

Gallagher et al[17] (2015) evaluated 167 patients who underwent 121 selective neck dissections and 46 modified radical neck dissections, in order to explore the effect of adjuvant treatment on shoulder-related quality of life, leisure activities and employment for patients undergoing neck dissection for head and neck cancer. Patients were asked to complete the Neck Dissection Impairment Index (NDII), with scores ranging from 0-100 and higher scores indicating better shoulder-related quality of life. The authors concluded that more aggressive treatment, either in the form of surgical dissection, radiation therapy or chemotherapy, was associated with worse shoulder-related quality of life. However, other authors have reported contradictory findings. In a study by Saunders and Hirata (1985), shoulder function remained normal or near-normal in 67% of patients who were questioned for symptoms related to loss of trapezius muscle function and in 25% of patients as shown by electromyography (EMG). Conversely, the probability of functional shoulder impairment in patients who underwent MRND, sparing the spinal accessory nerve, is reported to range from 20% to 30%. These findings have been ascribed to dual innervation of the trapezius muscle, both superficial and subfascial anastomosis, which explains that preserving the anatomical integrity of spinal accessory nerve may not guarantee absolute function of the trapezius muscle.

Eickmeyer et al[10] (2014) presented a study to determine the association of neck dissection and radiation treatment for head and neck cancer (HNC) with subsequent shoulder range of motion (ROM) and quality of life (QOL) in 5-year survivors. One hundred and five survivors were made to complete QOL surveys, while 85 survivors underwent additional shoulder ROM evaluations. The group in which nerve was sacrificed, was found to exhibit significantly poorer scores for UWQOL measures of disfigurement, level of activity,

recreation/entertainment, speech, shoulder disability, and willingness to eat in public, FACT functional well-being, and FACT-HN. Shoulder ROM for abduction and flexion was poorest in the nerve sacrifice group, being restricted to 100-140 degrees, while for nerve sacrifice group the mean value was 140 degrees. Radiation therapy was associated with significantly worse UWQOL swallowing scores but no other differences were found for QOL or ROM measurements. Decreased QOL scores were associated with decreased shoulder abduction and flexion. Patients with decreased shoulder abduction had significantly worse scores in disfigurement, recreation/entertainment, employment, shoulder disability and FACT emotional well-being.

Stuiver et al[18] (2008) reported a prospective multicenter study to explore relationships between shoulder complaints after neck dissection, shoulder disability, and quality of life. Shoulder pain, shoulder mobility and shoulder droop, as well as scores on shoulder disability questionnaire and RAND-36 (quality of life), were measured at baseline, discharge (T1), and 4 months postoperatively (T2) in 139 patients who underwent neck dissection at major head and neck centers in the Netherlands. Shoulder mobility was found to have significantly decreased at T1 and did not improve. Shoulder droop was present in 57 percent of cases and remained essentially unchanged over the follow-up period. The authors concluded that clinical predictors for mid-term to long-term shoulder disability are (1) a decrease in active range of motion of abduction and forward flexion in combination with nonselective neck dissection and the presence of shoulder droop, and (2) a combination of pain on external rotation of the shoulder and a higher score for pain on numerical rating scale.

Taylor et al[7] (2002) conducted a cross-sectional study on 54 patients undergoing 64 selective or modified radical neck dissections. A 10-item self-report instrument, the Neck Dissection Impairment Index (NDII), was developed to assess the impairment in quality of life associated with dysfunction of shoulder and neck in relation to type of neck dissection performed. Multivariate regression analysis showed that the variables that contributed most to quality of life score were patient's age and weight, radiation treatment and type of neck dissection (SND vs MRND).

Chepeha et al[19] (2002) reported a study on functional assessment of shoulder dysfunction consequent to neck dissection, using the Constant's Shoulder Scale in 32 patients who underwent MRND versus 32 patients who underwent SND. To determine the variables which were predictive for shoulder dysfunction, multivariable regression analysis was employed. Clinical covariates included neck dissection type, tumour stage and site, age, time from surgery, handedness, weight and radiation therapy. Patients who underwent MRND had significantly worse shoulder function compared to patients who underwent SND. Radiation therapy had a negative influence whereas higher weight had a favourable influence.

Shah et al[20] (2001) presented a study on assessment of short term and long term quality of life after neck dissection. Fifty-one patients who underwent neck dissection completed a 6-item quality-of-life survey with a 7-point frequency and interference response scale. General QOL and comorbidity biases were evaluated with the SF-12 questionnaire and the Charlson comorbidity index. The symptoms most commonly experienced in postoperative period were neck tightness (71%), numbness or burning of the ear (57%), and shoulder discomfort (53%). However, interference with daily activities was reported by only 37%, 32%, and 33% of patients with these symptoms, respectively. Within 2 years of surgery, interference with daily

activities decreased to 17%, 18%, and 12%, respectively. QOL after neck dissection was negatively associated with previous radiation, previous chemotherapy, tumour stage, and more radical neck surgery but was positively associated with time after surgery. Shoulder discomfort and neck tightness had the greatest effect on QOL.

Much like many surgical procedures which evolved to their present form, from the pre-antibiotic era to the present century, the procedure of neck dissection has been modified to more conservative procedures which are considered to be associated with better quality of life. The surgical technique of neck dissection was first presented as a systematic procedure by George Crile in 1906, who reported his results on radical neck dissection. This procedure was considered the "Gold standard" for treatment of regional metastasis from head and neck cancer, for many decades. Later, Bocca from Italy and Suarez from Argentina, presented the technique of Functional neck dissection. A volley of papers followed, reporting the results of this new technique which preserved the spinal accessory nerve. Thereafter, the American Head and Neck Society published the classification of modified radical neck dissection in 1991, describing it as types I, II and III. Gradually, there were studies on selective neck dissection. However, many advanced oncological centres still prefer RND and MRND type I for advanced stage oral cancer.

Various studies have reported shoulder complaints in the range of 47-100%, 18-77% and 31-40% for RND, MRND and SND respectively. In our study, shoulder complaints were reported by 66.6% percent subjects in RND group, 56% in MRND group I (nerve not preserved), 12% in MRND group II (nerve preserved) and 4% percent in SND group. There were only four subjects in RND group, who displayed good compliance to physiotherapy protocol. Similarly, there were only 5 subjects in SND group who underwent SOHND (supra omohyoid neck dissection) or extended SOHND. All five were young subjects with T staging cT2. Our subjects in MRND group displayed good pattern of adherence to physiotherapy protocol with acceptable compliance. Many of these patients were labourers by occupation who had good muscle strength, fired by the will to work for a decent living. Furthermore, there were minimal postoperative neck wound related complications in all subjects, with timely healing and early discharge. This can be related to meticulous intraoperative skill, use of Ligasure in neck dissection, good postoperative care and absence of infection in neck wound. All patients were instructed to comply with physiotherapy protocols through twice weekly telephonic conversations.

Most authors have analysed shoulder related morbidity one month after discharge from hospital. We followed a similar protocol at our centre and analysed the shoulder range of motion at time of discharge, 1, 3 and 6 months after neck dissection. In our study, the mean range of motion for lateral abduction was 163 degrees in RND group, 165 degrees in MRND group I, 170 degrees in MRND group II and 173 degrees in SND group. The range of forward flexion was 164 degrees in RND group, 166 degrees in MRND group I, 169 degrees in MRND group II and 176 degrees in SND group. These results are better than those reported by Eickmeyer et al[10]. Also, other than assessment of neck and shoulder related complaints, we analysed the overall quality of life through UWQOL questionnaire. The mean composite score was 74.8 in domains of speech, swallowing, saliva, pain, recreation, mood, anxiety, daily activities and overall QOL. Patients having inferior score had advanced stage disease at age

greater than 60 years. Reconstruction by free flaps was a major factor in preserving shoulder range of motion.

In our study, shoulder drooping was identified in 100% of patients in RND group, 100% of patients in MRND group I (nerve not preserved), zero percent of patients in MRND group II (nerve preserved) and zero percent of patients SND group. Review of literature shows wide range of results reported for incidence of shoulder drooping. Cheng et al reported shoulder drooping in 80% of patients in RND group while Cappiello et al[11] reported shoulder drooping in 30% of patients in MRND group.

18% of our patients underwent reconstruction with PMMC flap – eleven in MRND Group and one in RND group. The shoulder AROM and QOL scores were inferior as compared to those patients who underwent reconstruction with free flaps. Patients who underwent RND and MRND achieved good shoulder AROM and QOL scores two months after surgery, while patients treated with SND achieved good scores one month after surgery. 25% of patients in RND group (n=2), 40% in MRND group I and 66% in MRND group II were able to lift heavy objects (> 4-5 kg) 3 months after surgery, as compared to 71.4% of patients in SND group. The results improved at time interval of 6 months from surgery, which is similar to findings of Laverick et al.[12]

CONCLUSION:

Most of our results are comparable to those of other studies in the literature. However, patients in RND and MRND groups of our study, along with those suffering from stage III and IVa disease, exhibited better outer outcomes as compared to those reported previously in literature. This was due to better adherence and compliance to the physiotherapy protocol, more spinal accessory nerve preserving MRND, meticulous neck dissection and more use free microvascular reconstruction in our study.

Conflict of interests:

The authors declare that there is no conflict of interests that could influence this work.

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