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Assessment of YouTube as an Educational Tool in Teaching Key Indicator Cases in Otolaryngology During the COVID-19 Pandemic and Beyond: Neck Dissection

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OBJECTIVES: YouTube has become the preferred resource for trainees in otolaryngology to prepare for surgery. This study aimed to compare the evaluation by 2 attending physicians and 2 resident physicians of the quality of videos on YouTube on neck dissection, a key indicator case in head and neck surgery. The authors aimed to assess the quality and quantity of YouTube videos available for development of a virtual surgical educational curriculum for trainees in otolaryngology.

METHODS: Using the YouTube search feature, the top 10 videos by relevance and view count were compiled using the following search terms: radical neck dissection, selective neck dissection, modified radical neck dissection, lateral neck dissection, levels I-III neck dissection, levels II-IV, left neck dissection, right neck dissection, cervical nodal dissection, and supraomohyoid neck dissection. A total of 37 videos on neck dissection were identified and analyzed using the LAP-VEGaS criteria as well as author-specific modified LAP-VEGaS criteria.

RESULTS: The mean comprehensive LAP-VEGaS score was 8.74 (SD 3.10). The majority of videos (24/37) were designated as medium quality; 10 of 37 videos were low quality and 3 of 37 videos were high quality. In the total group analysis, there was excellent inter-rater reliability between attending physicians (Cohen’s kappa coefficient of 0.84) and good inter-rater reliability between resident physicians (Cohen’s kappa coefficient of 0.58). There was no correlation between total view count, video age, or number of likes/dislikes and the overall LAP-VEGaS score. The presence of audio or written commentary had a moderate positive correlation with LAP-VEGaS score (adjusted R² of 0.36). There was no statistically significant difference in video quality between videos posted by US and non-US based physicians (95% confidence interval −0.10 to 4.10; p = 0.06). However, videos made by an otolaryngology-trained physician had a LAP-VEGaS score that was 3.93 points higher (95% confidence interval 2.34–5.52; p < 0.001) than that of videos made by a non-otolaryngology-trained physician.

CONCLUSIONS: Online videos of neck dissection represent an increasingly ubiquitous and appropriate resource for trainees in learning otolaryngology key indicator cases. While free-to-access video repositories, such as YouTube, have become increasingly popular among trainees as a primary resource for learning and preparing for surgical cases, they lack consistent quality and as such, global efforts should be taken to improve the breadth and depth of educational video content in otolaryngology.

LEVEL OF EVIDENCE: N/A

KEY WORDS: otolaryngology surgical education, YouTube, virtual curriculum, neck dissection, key indicator cases, COVID-19 pandemic

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INTRODUCTION

Over the last several decades, technology has revolutionized medical education. In the present day, trainees have access to online resources that include, but are not limited, to research journals, specialized applications, textbooks, and educational videos.1,2 Specifically, online video publications such as the Journal of Medical Insight, the Journal of Visualized Surgery, CSurgeries, and the Journal of Visualized Experiments, as well as video-sharing websites, such as YouTube and Vimeo, have become platforms to disseminate otolaryngology surgical videos. Despite rapid improvements in technology and access, high-quality otolaryngology-specific videos often require a paid subscription.3 As such, trainees often turn to free-to-access, online educational content; in fact, a recent study by Rapp et al. found that 90% of learners (residents and medical students) reported using videos for surgical preparation. Furthermore, among those learners who used video sources to prepare for surgical cases, 95% reported using YouTube.4 However, while operative videos on YouTube are ubiquitously used in surgical education, YouTube content is not selected for quality of content but instead is ranked by popularity as well as a variety of other proprietary metrics including view count, comments, and likes/dislikes. Several studies have shown that for general surgery procedures such as laparoscopic cholecystectomies and appendectomies, the majority of videos evaluated demonstrated concerning maneuvers, failure to maintain an adequate critical view of safety, or poor educational quality (including lack of audio, no discussion of relevant anatomy, etc.).5,6 In otolaryngology, similar studies have largely focused on general information for procedures such as tonsillectomies and ear tube placements; those studies found that fewer than 25% of videos provided accurate and helpful information.7,8 However, these studies did not use validated methodologies to address video quality. One study conducted by Shires et al. evaluated thyroid surgery videos using surgeon-author characteristics and audience response as surrogates for video quality. The authors found that the majority of videos were posted by surgeons without a publication history in thyroid surgery.9

The novel coronavirus 2019 (COVID-19) pandemic has brought unprecedented challenges to the healthcare community. While providing clinical care and ensuring public health are key priorities, it is important to consider the impact of COVID-19 on surgical education. Medical student clinical participation has been suspended indefinitely.10 Furthermore, the American College of Surgeons and government institutions have recommended against the continuation of elective surgery. As a result, many institutions are restricting participants in surgical operations to essential personnel only.11 These changes are resulting in a reduction in surgical case volume for residents and fellows. Institutions have responded with curriculum changes to include flipped classroom learning, expanded didactic sessions, and online video-based learning.12,13 As such, it is important to critically evaluate the library of video content that is available for trainees to continue honing their operative acumen.

The aim of this study is to objectively analyze the quality of videos on YouTube as an educational tool in learning how to perform a neck dissection, one of the key indicator cases for trainees in otolaryngology.

METHODS

Using the YouTube (YouTube, Alphabet Inc., Mountain View, CA) search feature, the top 10 videos by relevance and view count were compiled using the following search terms: radical neck dissection, selective neck dissection, modified radical neck dissection, lateral neck dissection, levels I-III neck dissection, levels II-IV, left neck dissection, right neck dissection, cervical nodal dissection, and supraomohyoid neck dissection. Only videos that demonstrated an open approach to neck dissection were included. Exclusion criteria included endoscopic approach, presentations without video footage, patient testimonials, consumer advertisements, and cadaveric dissections. Every video was evaluated independently by four evaluators; the evaluators are otolaryngology residents (C.Y. and J.D.) and attendings (K.T. and P.T.). Video-based data including date published, view count, video length, likes, and dislikes were measured. The presence of audio and/or subtitles as well as the surgeon’s specialty and country of practice were noted. Finally, each video was graded according to the LAParoscopic surgery Video Educational GuidelineS (LAP-VEGaS), a validated video assessment tool.14,15 LAP-VEGaS guidelines include nine line items with every item being scored from 0 (item not present in the video) to 2 (item extensively presented in the video), with a total marking score ranging from 0 to 18. The assessment tool was developed for identifying and selecting videos for acceptance for conference presentation and publication and as such, provides an assessment tool with a high level of internal consistency and generalizability. The authors grouped scores into categories of low, medium, or high quality (low: 0-6, medium: 7-12, high: 13-18). Because the authors wanted to focus on free-to-
access videos on YouTube as opposed to videos created for submission to conferences and presentations, they also performed a modified subgroup analysis based on the original LAP-VEGaS assessment scale to focus on the audiovisual and content quality of the surgery itself; this scale used items 3, 4, 5, 8, and 9 from the LAP-VEGaS guidelines to derive a modified 10-point scale (low: 0-3, medium: 4-7, high: 8-10). Two-sample t tests were performed to look at the quality difference between United States (US) based and non-US based physicians as well as otolaryngology versus nonotolaryngology trained physicians. The specialty training of the video authors was determined via Google search engine inquiry of the video author’s name. If the author was in academic practice, their specialty training history was referenced from their academic faculty profile. If the author was in independent and/or private practice, their specialty training history was referenced from their biography and description of clinical experience. Inter-rater reliability between attending physicians and resident physicians was calculated using Cohen’s kappa coefficient. Statistical analysis was performed with Microsoft Excel. This study is exempt from institutional review board approval, because it involves research using publicly available video footage whereby participants were deidentified.

RESULTS

Video Characteristics

The search terms for “neck dissection” identified a total list of 37 YouTube videos that met inclusion criteria for analysis. The characteristics of the selected 37 videos are described in Table 1. The videos had a total of 938,613 overall views with average viewership totaling 25,368 views; videos had as few as 82 views and as many as 114,556 views. On average, videos were 4.1 years old; videos ranged from 0.1 years old to 11 years old. The average length of videos was approximately 13 minutes; the shortest video was 2 minutes long, while the longest video was 48 minutes long. These videos had an average of 91 likes (range 0-601) and 6 dislikes (range 0-34). Overall, 7 of 37 (19%) of videos were made in India. The remaining 16 of 37 (43%) of videos were made by surgeons in Brazil, France, Germany, Japan, New Zealand, South Korea, Spain, Turkey, and the United Kingdom. Otolaryngologists narrated 22 of 37 (59%) of videos; 10 of 37 (27%) of videos were posted by surgical oncologists. Only 25 of 37 (68%) of videos had audio; of the 12 of 37 (32%) remaining videos, 4 had subtitles to annotate the surgery.

Video Content and Quality Assessment Using LAP-VEGaS Guidelines

The comprehensive LAP-VEGaS assessment is displayed in Table 2. In the comprehensive assessment, values of low, medium, and high quality were attributed to videos with scores of LAP-VEGaS scores of 0-6, 7-12, and 13-18, respectively (Table 3). The mean comprehensive LAP-VEGaS score was 8.74 (SD 3.10). The majority of videos (24/37) were designated as medium quality; 10 of 37 videos were low quality and 3 of 37 videos were high quality. In the total group analysis, there was excellent inter-rater reliability between attending physicians (Cohen’s kappa coefficient of 0.84) and good inter-rater reliability between resident physicians (Cohen’s kappa coefficient of 0.58).

The modified LAP-VEGaS assessment is displayed in Table 4. In the modified assessment, values of low, medium, and high quality were attributed to videos with modified LAP-VEGaS scores of 0-3, 4-7, and 8-10, respectively (Table 5). The mean subgroup LAP-VEGaS score was 6.03 (SD 1.99). The majority of videos (25/37) were designated as medium quality; 4/37 were determined to be low quality and 8 of 37 were determined to be high quality. In the modified subgroup analysis, there was fair inter-rater reliability between attending physicians (Cohen’s kappa coefficient of 0.33) with good inter-rater reliability between resident physicians (Cohen’s kappa coefficient of 0.47).

Factors Associated With Overall Video Quality

Two-sample t test (assuming same variance) and linear regression analyses were performed on video characteristics to ascertain factors associated with overall video quality and are displayed in Table 6. In both the total and subgroup analyses, there was no statistically significant difference in video quality between videos posted by US and non-US based physicians (95% confidence interval [CI] −0.10 to 4.10; p = 0.06 and 95% CI: −1.00 to 2.26; p = 0.44, respectively). However, videos made by an otolaryngology-trained physician had a LAP-VEGaS score that was 3.93 points higher (95% CI: 2.34-5.52; p < 0.001) in total score and 2.37 points higher (95% CI: 1.26-3.48; p < 0.001) in subgroup score. View count and video age were not correlated with the overall video quality score (adjusted R² value of −0.03 to 0.01). The likes:dislikes ratio (“L:D ratio”) of the video had a weakly positive correlation with the overall video quality score (adjusted R² value of 0.09 and 0.13 for total and subgroup score, respectively). The presence of narrated audio and/or subtitle annotations had a moderately positive correlation with overall video quality score (adjusted R² value of 0.36 and 0.40 for total and subgroup score, respectively).
| Number | Title and Link                                                                 | View Count | Video Age (in Years) | Length | Likes | Dislikes | Specialty      | Country       |
|--------|---------------------------------------------------------------------------------|------------|----------------------|--------|-------|----------|----------------|---------------|
| 1      | Selective neck dissection HD [https://www.youtube.com/watch?v=ufQzvPuMedo]      | 114,556    | 5.92                 | 0:12:45| 601   | 34       | Otolaryngology | France        |
| 2      | Modified Radical Neck Dissection Part I. Dr John M Chaplin, Auckland, New Zealand [https://www.youtube.com/watch?v=UFO9RqXUEw] | 104,009    | 7.17                 | 0:09:40| 314   | 17       | Otolaryngology | New Zealand   |
| 3      | Neck Dissection part 1, Dr. Gopinath [https://www.youtube.com/watch?v=IKvUHRA4xU] | 94,452     | 11.00                | 0:08:03| 73    | 14       | Surgical Oncology | India         |
| 4      | Neck Dissection from 3D Anatomy for Otolaryngology and Head and Neck Surgery [https://www.youtube.com/watch?v=mIDi_VtRSi8] | 83,560     | 8.00                 | 0:02:30| 125   | 9        | Unknown        | United Kingdom |
| 5      | TOTAL LARYNGECTOMY WITH LEVEL II, III, IV NECK DISSECTION [https://www.youtube.com/watch?v=3S9MB6KrWk] | 52,724     | 8.25                 | 0:02:16| 32    | 11       | Otolaryngology | India         |
| 6      | Complete Left Lateral Neck Dissection [https://www.youtube.com/watch?v=7Qsw5YS1O1] | 48,685     | 3.17                 | 0:05:45| 223   | 10       | Otolaryngology | USA           |
| 7      | Part 2 of a Modified Radical Neck Dissection by Dr John Chaplin, Auckland, New Zealand [https://www.youtube.com/watch?v=1_A9IPkdmlM] | 46,925     | 7.17                 | 0:10:09| 205   | 5        | Otolaryngology | New Zealand   |
| 8      | Functional neck dissection using the fascial plane technique: J Gavilán [https://www.youtube.com/watch?v=sdqQxbZMUL] | 46,807     | 5.33                 | 0:12:05| 314   | 10       | Otolaryngology | Spain         |
| 9      | Radical Neck Dissection (HD)- Head Neck Surgery- Dr Rajnish Talwar [https://www.youtube.com/watch?v=AKBN5NaWJAI] | 41,012     | 6.67                 | 0:22:55| 151   | 11       | Surgical Oncology | India         |
| 10     | Functional Neck Dissection [https://www.youtube.com/watch?v=6izTULvXmI] | 39,925     | 5.92                 | 0:05:24| 70    | 9        | Otolaryngology | Italy         |
| 11     | Right Selective Neck Dissection levels Ila-Vb. Audio Dr John M Chaplin, Auckland, New Zealand [https://www.youtube.com/watch?v=0VQyP6JXg] | 38,739     | 7.17                 | 0:09:59| 94    | 9        | Otolaryngology | New Zealand   |
| 12     | Video Panel 1 Surgical Pearls for Neck Dissection – Management of the N0 Neck [https://www.youtube.com/watch?v=TnGDC9XgM&E=1] | 38,335     | 5.58                 | 0:15:40| 203   | 2        | Otolaryngology | USA           |
| 13     | Functional Neck Dissection with Total Thyroidectomy- Berchtold Diathermy [https://www.youtube.com/watch?v=ixnC9gVtVb] | 25,258     | 7.17                 | 0:23:21| 39    | 10       | Surgical Oncology | India         |
| 14     | Right Neck Dissection for Thyroid Cancer [https://www.youtube.com/watch?v=OHb62aQCCq] | 23,281     | 3.17                 | 0:05:32| 125   | 10       | Otolaryngology | USA           |
| 15     | MODIFIED RADICAL NECK DISSECTION BY DR GUNJAN AGRAWAL [https://www.youtube.com/watch?v=ekLUB37saJ] | 22,392     | 5.33                 | 0:21:38| 45    | 18       | Oral and Maxillofacial Surgery | India |
| 16     | RND- Radical Neck Dissection- Electrosurgery Video- Dr Rajnish Talwar [https://www.youtube.com/watch?v=P7vByBF8oPQ] | 17,611     | 7.75                 | 0:22:55| 35    | 4        | Surgical Oncology | India         |
| 17     | Modified Radical Neck Dissection type 3 (MRND) by Dr Sandeep Nayak, Bangalore [https://www.youtube.com/watch?v=Lagc2aKXg] | 15,468     | 8.17                 | 0:07:29| 26    | 3        | Surgical Oncology | India         |

(continued on next page)
| Number | Title and Link | View Count | Video Age (in Years) | Length | Likes | Dislikes | Specialty | Country          |
|--------|----------------|------------|----------------------|--------|-------|----------|------------|------------------|
| 18     | SUPRAOMOHYOID NECK DISSECTION [https://www.youtube.com/watch?v=ncEBqMjl4](https://www.youtube.com/watch?v=ncEBqMjl4) | 14,210     | 2.92                 | 0:07:02| 64    | 5        | Otolaryngology | Brazil           |
| 19     | Radical Neck Dissection by Prof Rajaraman [https://www.youtube.com/watch?v=nFlAS4ULP.4](https://www.youtube.com/watch?v=nFlAS4ULP.4) | 12,651     | 2.17                 | 0:32:30| 123   | 3        | Surgical Oncology | India            |
| 20     | Supraomohyoid Neck Dissection for buccomandibular squamous cell carcinoma [https://www.youtube.com/watch?v=GGbPPPthUMF8](https://www.youtube.com/watch?v=GGbPPPthUMF8) | 10,508     | 5.00                 | 0:04:49| 17    | 7        | Facial Plastic and Reconstructive Surgery | Turkey |
| 21     | NECK DISSECTION step by step [https://www.youtube.com/watch?v=L8u6VuA50K8](https://www.youtube.com/watch?v=L8u6VuA50K8) | 9,286      | 1.00                 | 0:12:48| 113   | 6        | Otolaryngology | India            |
| 22     | Lymph Node Dissection for Well-Differentiated Thyroid Cancer [https://www.youtube.com/watch?v=3Mr8NH4bjOM&t=13s](https://www.youtube.com/watch?v=3Mr8NH4bjOM&t=13s) | 7,723      | 3.17                 | 0:13:37| 32    | 3        | Surgical Oncology | USA              |
| 23     | Selective Neck Dissection Level II-IV (Using the Fascial Plane) [https://www.youtube.com/watch?v=GGbPPPthUMF8](https://www.youtube.com/watch?v=GGbPPPthUMF8) | 5,245      | 1.75                 | 0:12:01| 77    | 0        | Otolaryngology | Italy            |
| 24     | Video Panel 1 Surgical Pearls for Neck Dissection — Management of the Lateral Neck in Papillary T [https://www.youtube.com/watch?v=FryPUJxhZA](https://www.youtube.com/watch?v=FryPUJxhZA) | 4,680      | 5.58                 | 0:17:00| 12    | 3        | Otolaryngology | Japan            |
| 25     | Comprehensive Left Lateral Neck Dissection [https://www.youtube.com/watch?v=9oWOSCTAeow](https://www.youtube.com/watch?v=9oWOSCTAeow) | 3,634      | 3.17                 | 0:06:05| 19    | 1        | Otolaryngology | USA              |
| 26     | Selective Radical Neck Dissection 2-5 [https://www.youtube.com/watch?v=5og5FJ-wb2E&t=42s](https://www.youtube.com/watch?v=5og5FJ-wb2E&t=42s) | 3,372      | 0.50                 | 0:24:22| 35    | 0        | Otolaryngology | USA              |
| 27     | Level II-IV Select Neck Dissection [https://www.youtube.com/watch?v=TdKQ22w70I0](https://www.youtube.com/watch?v=TdKQ22w70I0) | 2,968      | 0.08                 | 0:24:36| 65    | 2        | Surgical Oncology | USA              |
| 28     | Selective neck dissection [https://www.youtube.com/watch?v=J-oIbEXixs](https://www.youtube.com/watch?v=J-oIbEXixs) | 2,543      | 1.75                 | 0:14:54| 41    | 0        | Otolaryngology | India            |
| 29     | Supra Omohyoid Neck Dissection - Dr. Subbiah Shanmugam, Chennai [https://www.youtube.com/watch?v=TEd6m6OVVUt](https://www.youtube.com/watch?v=TEd6m6OVVUt) | 1,520      | 1.58                 | 0:15:48| 19    | 0        | Surgical Oncology | India            |
| 30     | Modified radical neck dissection [https://www.youtube.com/watch?v=6qmgzyyXh8w](https://www.youtube.com/watch?v=6qmgzyyXh8w) | 1,319      | 0.83                 | 0:09:24| 5     | 0        | Unknown          | Unknown          |
| 31     | Neck Dissection II-IV Part 2: Level Ilb [https://www.youtube.com/watch?v=jbh_k7FyPK](https://www.youtube.com/watch?v=jbh_k7FyPK) | 1,192      | 1.58                 | 0:08:34| 15    | 1        | Otolaryngology | Germany          |
| 32     | Supra omohyoid Neck dissection mudit [https://www.youtube.com/watch?v=Oe REeUk](https://www.youtube.com/watch?v=Oe REeUk) | 1,070      | 2.50                 | 0:08:10| 6     | 0        | Surgical Oncology | India            |
| 33     | Neck Dissection II-IV Part 1: Skin Flap [https://www.youtube.com/watch?v=V94c wsZU](https://www.youtube.com/watch?v=V94c wsZU) | 994        | 1.67                 | 0:05:01| 14    | 1        | Otolaryngology | Germany          |
| 34     | Supraomohyoid Neck Dissection [https://www.youtube.com/watch?v=WoaF9y60Mfc](https://www.youtube.com/watch?v=WoaF9y60Mfc) | 923        | 0.67                 | 0:05:29| 10    | 0        | Otolaryngology | India            |
| 35     | Neck Dissection II-IV Part 3: Level Iia-IV [https://www.youtube.com/watch?v=Uu5sQEOCS0](https://www.youtube.com/watch?v=Uu5sQEOCS0) | 590        | 1.33                 | 0:05:53| 8     | 0        | Otolaryngology | Germany          |
| 36     | SupraOmohyoid neck dissection Dr Vijay Haribhakti [https://www.youtube.com/watch?v=aaq09Phwzl](https://www.youtube.com/watch?v=aaq09Phwzl) | 364        | 0.75                 | 0:11:00| 4     | 0        | Surgical Oncology | India            |
| 37     | Modified Radical Neck Dissection [https://www.youtube.com/watch?v=h-sj5qegisk](https://www.youtube.com/watch?v=h-sj5qegisk) | 82         | 0.08                 | 0:47:53| 0     | 0        | Oral and Maxillofacial Surgery | South Korea |
| Number | Title and Link                                                                 | Positioning | Surgical Procedure | Intraoperative Findings | Procedure Outcomes | Additional Graphic Content | English Audio/Commentary | Image Quality LAP-VEGaS (Total) |
|--------|--------------------------------------------------------------------------------|-------------|--------------------|-------------------------|-------------------|---------------------------|--------------------------|------------------------------|
| 1      | Selective neck dissection HD [link](https://www.youtube.com/watch?v=ufQzvPuMedo) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 2      | Modified Radical Neck Dissection Part I by Dr John M Chaplin, Auckland, New Zealand [link](https://www.youtube.com/watch?v=UF0RpRXrUEw) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 3      | Neck Dissection part I, Dr Gopinath [link](https://www.youtube.com/watch?v=IKvUHRA4XuU) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 4      | Neck Dissection from 3D Anatomy for Otolaryngology and Head and Neck Surgery [link](https://www.youtube.com/watch?v=mJDi_VtRSi8) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 5      | TOTAL LARYNGECTOMY WITH LEVEL II/III NECK DISSECTION [link](https://www.youtube.com/watch?v=3S9MBy8krWo) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 6      | Complete Left Lateral Neck Dissec [link](https://www.youtube.com/watch?v=RX7Qw555XlE) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 7      | Part 2 of a Modified Radical Neck Dissection by Dr John Chaplin, Auckland, New Zealand [link](https://www.youtube.com/watch?v=JKKkZaBzWU) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 8      | Functional neck dissection using the fascial plane technique: J Cav [link](https://www.youtube.com/watch?v=4a4Z2ZfYUA) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 9      | Radical Neck Dissection (HD)- Head Neck Surgery Dr Rajnish Talwar [link](https://www.youtube.com/watch?v=A16N54HVbW) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 10     | Functional Neck Dissection [link](https://www.youtube.com/watch?v=JUuLSQJzWU) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 11     | Right Selective Neck Dissection leve [link](https://www.youtube.com/watch?v=O9qYrjJoxKs) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| 12     | Video Panel 1 Surgical Pearls for Neck Dissection – Management of the NO Neck [link](https://www.youtube.com/watch?v=InGCD2C9XaM) | R1 R2 R3 R4 | R1 R2 R3 R4        | R1 R2 R3 R4            | R1 R2 R3 R4        | R1 R2 R3 R4                | R1 R2 R3 R4               | R1 R2 R3 R4                   |
| Number | Title and Link |
|--------|----------------|
| 13     | Functional Neck Dissection with Total Thyroidectomy - Berchtold Diathermy |
| 14     | Right Neck Dissection for Thyroid Cancer |
| 15     | MODIFIED RADICAL NECK DISSECTION BY DR GUNJAN AGRAWAL |
| 16     | RND: Radical Neck Dissection, Electrosurgery Video - Dr Rajnish Talwar |
| 17     | Modified Radical Neck Dissection type 3 (MRND) by Dr Sandeep Nayak, Bangalore |
| 18     | SUPRAOMOHYOID NECK DISSECTION |
| 19     | Radical Neck Dissection by Prof Rajaraman |
| 20     | Supraomohyoid Neck Dissection for buccomandibular squamous cell carcinoma |
| 21     | NECK DISSECTION step by step |
| 22     | Lymph Node Dissection for Well Differenitated Thyroid Cancer |
| 23     | Selective Neck Dissection Level III |
| 24     | Video Panel 1 Surgical Pearls for Neck Dissection - Management of the Lateral Neck in Papillary T |

(continued on next page)
| Number | Title and Link |
|--------|----------------|
| 25     | Comprehensive Left Lateral Neck Dissection [https://www.youtube.com/watch?v=9aWOSCTAexw] |
| 26     | Selective Radical Neck Dissection 2-5 [https://www.youtube.com/watch?v=5og5FJ-wb2E&t=42s] |
| 27     | Level IV Select Neck Dissection [https://www.youtube.com/watch?v=TaKQ22w790] |
| 28     | Selective neck dissection [https://www.youtube.com/watch?v=J0J_Bexas6] |
| 29     | Supra Omohyoid Neck Dissection - Dr. Subbiah Shanmugam, Cheng [https://www.youtube.com/watch?v=TEdhm6OVutw] |
| 30     | Modified radical neck dissection [https://www.youtube.com/watch?v=R6gmzyyXh8w] |
| 31     | Neck Dissection IV Part 2: Level Iib [https://www.youtube.com/watch?v=Characteristic:04;L9S] |
| 32     | supra omohyoid Neck dissection [https://www.youtube.com/watch?v=Characteristic:04;L9S] |
| 33     | Neck Dissection IV Part 1: Skin Flap [https://www.youtube.com/watch?v=Characteristic:04;L9S] |
| 34     | Supraomohyoid Neck Dissection [https://www.youtube.com/watch?v=Characteristic:04;L9S] |
| 35     | Neck Dissection IV Part 3: Level IicN [https://www.youtube.com/watch?v=Characteristic:04;L9S] |
| 36     | Supraomohyoid neck dissection Dr. Vijay Hanshule [https://www.youtube.com/watch?v=Characteristic:04;L9S] |
| 37     | Modified Radical Neck Dissection [https://www.youtube.com/watch?v=Characteristic:04;L9S] |
| Number | Title and Link                                                                 | R1   | R2   | R3   | R4   | Total |
|--------|-------------------------------------------------------------------------------|------|------|------|------|-------|
| 1      | Selective neck dissection HD [Link](https://www.youtube.com/watch?v=ufQzvPuMedo)| Medium | Medium | Medium | Medium | Medium |
| 2      | Modified Radical Neck Dissection Part I. Dr John M Chaplin, Auckland, New Zealand [Link](https://www.youtube.com/watch?v=UF0RpRXrUEw) | Medium | Medium | Medium | Medium | Medium |
| 3      | Neck Dissection Part I. Dr. Gopinath [Link](https://www.youtube.com/watch?v=IKvUHRA4xU) | Low   | Low   | Low   | Low   | Low   |
| 4      | Neck Dissection from 3D Anatomy for Otolaryngology and Head and Neck Surgery [Link](https://www.youtube.com/watch?v=mD1_VR5iB) | Medium | Medium | Low   | Low   | Low   |
| 5      | TOTAL LARYNGECTOMY WITH LEVEL II, III, IV NECK DISSECTION [Link](https://www.youtube.com/watch?v=3SGMBv8kWo) | Low   | Low   | Low   | Low   | Low   |
| 6      | Complete Left Lateral Neck Dissection [Link](https://www.youtube.com/watch?v=R7Qsw5Y5IO) | High  | Medium | Medium | Medium | Medium |
|        | Part 2 of a Modified Radical Neck Dissection by Dr John Chaplin, Auckland, New Zealand. [Link](https://www.youtube.com/watch?v=i_A9PkdmI) | Medium | Medium | Medium | Medium | Medium |
| 7      | Functional neck dissection using the fascial plane technique: J Gavilán [Link](https://www.youtube.com/watch?v=5qXbZMuA) | Medium | Medium | Medium | Medium | Medium |
| 8      | Radical Neck Dissection (HD)- Head Neck Surgery- Dr Rajnish Talwar [Link](https://www.youtube.com/watch?v=AKBNSvNoW1) | Medium | Medium | Medium | Medium | Medium |
| 9      | Functional Neck Dissection [Link](https://www.youtube.com/watch?v=61qTULxhM) | Low   | Low   | Low   | Low   | Low   |
| 10     | Right Selective Neck Dissection levels Ila-Vb. Audio Dr John M Chaplin, Auckland, New Zealand. [Link](https://www.youtube.com/watch?v=0VQyP6Jxks) | Medium | Medium | Medium | Medium | Medium |
| 11     | Video Panel 1 Surgical Pearls for Neck Dissection – Management of the NO Neck [Link](https://www.youtube.com/watch?v=7GCDC93XqGm&t=112s) | Medium | Medium | Medium | Medium | Medium |
| 12     | Functional Neck Dissection with Total Thyroidectomy: Berchtold Diathermy [Link](https://www.youtube.com/watch?v=XRwCTFyErk) | Medium | Medium | Medium | Medium | Medium |
| 13     | Right Neck Dissection for Thyroid Cancer [Link](https://www.youtube.com/watch?v=OHb62aGQCc9g) | Medium | Medium | Medium | Medium | Medium |
| 14     | MODIFIED RADICAL NECK DISSECTION BY DR GUNJIAN AGRAWAL [Link](https://www.youtube.com/watch?v=e9qUBs3s7sA) | Low   | Low   | Medium | Low   | Low   |
| 15     | RND- Radical Neck Dissection- Electrosurgery Video- Dr Rajnish Talwar [Link](https://www.youtube.com/watch?v=P7vBy8FBQopQ) | Medium | Medium | Medium | Low   | Medium |
| 16     | Modified Radical Neck Dissection type 3 (MRND) by Dr Sandeep Nayak, Bangalore [Link](https://www.youtube.com/watch?v=Lqic2aKXMyk) | Medium | Medium | Medium | Low   | Medium |
| 17     | SUPRAOMOHYOID NECK DISSECTION [Link](https://www.youtube.com/watch?v=FXvETMN6h4) | Medium | Medium | Medium | Medium | Medium |
| 18     | Radical Neck Dissection by Prof Rajaraman [Link](https://www.youtube.com/watch?v=nKAS4ULP_4) | Medium | Medium | Medium | Medium | Medium |
| 19     | Supraomohydoid Neck Dissection for buccomandibular squamous cell carcinoma [Link](https://www.youtube.com/watch?v=GGbPFThUMF8) | Low   | Low   | Medium | Low   | Low   |
| 20     | NECK DISSECTION step by step [Link](https://www.youtube.com/watch?v=L8u6VuA50K8) | High  | High  | High  | High  | High  |
| 21     | Medium | Medium | Medium | Medium | Medium |

(continued on next page)
| Number | Title and Link                                                                 | R1   | R2   | R3   | R4   | Total |
|--------|-------------------------------------------------------------------------------|------|------|------|------|-------|
| 23     | Lymph Node Dissection for Well-Differentiated Thyroid Cancer https://www.youtube.com/watch?v=VziSl7p_zNM | Medium | Medium | Medium | Medium | Medium |
| 24     | Selective Neck Dissection Level II-IV (Using the Fascial Plane) https://www.youtube.com/watch?v=3MrB8NH4bjOM&t=13s | High  | High  | Medium | High  | High  |
| 25     | Comprehensive Left Lateral Neck Dissection https://www.youtube.com/watch?v=9aWOSCTAexw | High  | Medium | Medium | Medium | Medium |
| 26     | Selective Radical Neck Dissection 2-5 https://www.youtube.com/watch?v=5og5FJ-wb2E&t=42s | Medium | Medium | Low   | Low   | Medium |
| 27     | Level II-IV Select Neck Dissection https://www.youtube.com/watch?v=TdKVQ22w70t0 | High  | High  | High  | High  | High  |
| 28     | Selective neck dissection https://www.youtube.com/watch?v=J-Oi_BexJXs | Medium | Medium | Medium | Medium | Medium |
| 29     | Supra Omohyoid Neck Dissection - Dr. Subbiah Shanmugam, Chennai https://www.youtube.com/watch?v=TEDdsm6OVUtw | Low   | Low   | Low   | Low   | Low   |
| 30     | Modified radical neck dissection https://www.youtube.com/watch?v=R6gqmsyyXhBw | Medium | Low   | Medium | Low   | Low   |
| 31     | Neck Dissection II-IV Part 2: Level IIb https://www.youtube.com/watch?v=Jbh_k7FlyPk | Medium | Medium | Medium | Medium | Medium |
| 32     | supra omohyoid Neck dissection mudit https://www.youtube.com/watch?v=OE_RERmU | Low   | Low   | Low   | Low   | Low   |
| 33     | Neck Dissection II-IV Part 1: Skin Flap https://www.youtube.com/watch?v=WyN4c_ws2uY | Medium | Medium | Medium | Medium | Medium |
| 34     | Supraomohyoid Neck Dissection https://www.youtube.com/watch?v=Woa9f9y6mfc | Medium | Medium | Medium | Medium | Medium |
| 35     | Neck Dissection II-IV Part 3: Level IIa-IV https://www.youtube.com/watch?v=Uu5s2QE0CSO | Medium | Medium | Medium | Medium | Medium |
| 36     | Supra Omohyoid neck dissection Dr Vijay Haribhakti https://www.youtube.com/watch?v=m_qyxo9Pwzl | Medium | Medium | Medium | Medium | Medium |
| 37     | Modified Radical Neck Dissection https://www.youtube.com/watch?v=h-sj5Geqisk | Low   | Low   | Medium | Low   | Low   |
| Number | Title and Link                                                                 | 3. Positioning | 4. Surgical Procedure | 5. Intraoperative Findings | 8. English Audio/Commentary | 9. Image Quality | LAP-VEGaS (Subgroup) |
|--------|-------------------------------------------------------------------------------|----------------|-----------------------|----------------------------|----------------------------|-----------------|-----------------|
| 1      | Selective neck dissection HD https://www.youtube.com/watch?v=ufQzvPuMedo       | 0 2 0 0 2 2 2 2 2 2 2 1 1 1 2 2 2 2 9 9 6 8 |                       |                            |                            |                 |                 |
| 2      | Modified Radical Neck Dissection Dr M Chaplin, Auckland, New Zealand https://www.youtube.com/watch?v=UF0RpRXUEw | 0 1 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 9 8 9 8 |                       |                            |                            |                 |                 |
| 3      | Neck Dissection Dr Param Dr Gopinath                                           | 0 1 1 2 1 2 0 1 1 1 1 0 1 1 1 1 6 5 4 3 |                       |                            |                            |                 |                 |
| 4      | Neck Dissection from 3D Anatomy for Otolaryngology and Head and Neck Surgery https://www.youtube.com/watch?v=359MbyBkrWm | 0 0 0 1 1 0 2 2 1 1 2 2 2 2 2 2 2 2 1 8 7 6 4 |                       |                            |                            |                 |                 |
| 5      | TOTAL LARYNGECTOMY WITH LEVEL II, III, IV NECK DISSECTION https://www.youtube.com/watch?v=stJmD_VRSiB | 0 0 1 1 0 1 1 1 1 1 1 1 0 2 0 1 1 2 4 4 5 |                       |                            |                            |                 |                 |
| 6      | Complete Left Lateral Neck Dissection https://www.youtube.com/watch?v=R7Q quadratic | 0 0 0 0 2 1 2 0 2 1 2 2 2 2 2 2 2 2 1 9 7 7 5 |                       |                            |                            |                 |                 |
| 7      | Part 2 of a Modified Radical Neck Dissection by Dr John Chaplin, Auckland, New Zealand https://www.youtube.com/watch?v=R7Q quadratic | 0 0 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 9 8 8 8 |                       |                            |                            |                 |                 |
| 8      | Functional neck dissection using the fascial plane technique: J Gavlak         | 0 0 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 9 8 8 7 |                       |                            |                            |                 |                 |
| 9      | Radical Neck Dissection (HD) Head Neck Surgery Dr Rajnish Talwar             | 0 1 2 1 2 2 0 1 2 1 1 2 2 2 2 1 2 1 1 8 10 7 4 |                       |                            |                            |                 |                 |
| 10     | Functional Neck Dissection                                                    | 0 0 0 0 1 1 0 1 1 0 0 0 0 0 0 0 0 2 1 3 4 2 1 |                       |                            |                            |                 |                 |
| 11     | Right Selective Neck Dissection https://www.youtube.com/watch?v=KvHuHaOxUa | 0 0 1 0 2 2 1 2 1 2 2 2 2 2 2 2 2 2 1 1 1 8 7 7 6 |                       |                            |                            |                 |                 |
| 12     | Video Panel 1 Surgical Pearls for Neck Dissection - Management of the NO Neck https://www.youtube.com/watch?v=TVgQP6JXoaX | 0 0 0 0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 1 7 7 7 6 |                       |                            |                            |                 |                 |
| 13     | Functional Neck Dissection with Total Thyroidectomy Berchtold Diathermy         | 0 0 0 0 2 2 1 2 2 2 2 2 2 2 1 2 2 2 1 1 1 8 6 7 6 |                       |                            |                            |                 |                 |
| 14     | Right Neck Dissection for Thyroid Cancer https://www.youtube.com/watch?v=hr6VzAs7Ma | 0 0 0 0 1 1 2 0 2 2 2 2 2 2 2 2 2 2 1 8 7 8 5 |                       |                            |                            |                 |                 |
| 15     | MODIFIED RADICAL NECK DISSECTION BY DR GUNJAN AGRAWAL https://www.youtube.com/watch?v=5yUB37bJSA | 0 1 0 0 1 0 2 0 0 0 1 0 0 0 0 0 1 1 2 3 2 5 2 |                       |                            |                            |                 |                 |
| 16     | RND- Radical Neck Dissection Electrosurgery Video Dr Rajnish Talwar           | 0 1 0 1 2 2 0 1 1 2 1 2 1 2 2 2 2 1 1 1 1 6 7 7 4 |                       |                            |                            |                 |                 |
| 17     | Modified Radical Neck Dissection type 3 (MRND) by Dr Sandeep Nayak, Bangalore https://www.youtube.com/watch?v=3pQ6A8Jb8O | 0 2 1 1 2 1 0 2 1 1 1 2 1 0 0 1 1 2 8 6 5 4 |                       |                            |                            |                 |                 |
| 18     | SUPRAOMOHYOID NECK DISSECTION https://www.youtube.com/watch?v=ncLoEh | 0 0 0 0 2 2 2 2 1 2 1 1 2 2 1 2 1 2 1 1 2 7 7 6 6 |                       |                            |                            |                 |                 |
| 19     | Radical Neck Dissection by Prof Rajaraman https://www.youtube.com/watch?v=RA54U4 | 0 1 0 1 2 1 2 0 2 1 1 1 1 1 1 2 2 8 7 6 5 |                       |                            |                            |                 |                 |
| 20     | Supraomohyoid Neck Dissection for buccomandibular squamous cell carcinoma https://www.youtube.com/watch?v=GGbPHTHUMF | 0 0 0 0 1 0 2 0 0 1 1 0 0 0 0 0 0 2 1 2 2 3 4 2 |                       |                            |                            |                 |                 |

(continued on next page)
| Number | Title and Link | 3. Positioning | 4. Surgical Procedure | 5. Intraoperative Findings | 8. English Audio/Commentary | 9. Image Quality | LAP-VEGaS (Subgroup) |
|--------|----------------|----------------|-----------------------|---------------------------|--------------------------|----------------|-------------------|
|        |                | R1  R2  R3  R4 | R1  R2  R3  R4 | R1  R2  R3  R4 | R1  R2  R3  R4 | R1  R2  R3  R4 | R1  R2  R3  R4 |
| 21     | NECK DISSECTION step by step | 0  2  1  1  1  2  2  2  2  2  2  2  2  2  2  2  1  1  1  9  9  9  9 | 8                  | |
|        | https://www.youtube.com/watch?v=L8u6VuA50K8 | | | | | | |
| 22     | Lymph Node Dissection for Well-Differentiated Thyroid Cancer | 0  0  0  0  0  0  0  0  0  1  0  2  2  2  2  0  1  0  5  2  4  2 | 4                  | |
|        | https://www.youtube.com/watch?v=VziSl7p_zNM | | | | | | |
| 23     | Selective Neck Dissection Level II (Using the Fascial Plane) | 0  0  0  0  2  2  2  2  1  2  2  2  1  2  2  2  2  2  2  1  9  6  8  7 | 4                  | |
|        | https://www.youtube.com/watch?v=3M8HNH4jO MI=13s | | | | | | |
| 24     | Video Panel 1 Surgical Pearls for Neck Dissection -- Management of the Lateral Neck in Papillary T | 0  1  0  0  2  2  2  2  1  1  1  2  2  2  2  2  1  2  2  9  7  7  7 | 4                  | |
|        | https://www.youtube.com/watch?v=FryPU-JxhZA | | | | | | |
| 25     | Comprehensive Left lateral Neck Dissection | 0  0  0  0  2  1  2  0  2  2  1  2  2  2  2  2  2  2  2  2  1  9  7  7  5 | 4                  | |
|        | https://www.youtube.com/watch?v=kxVOGStAexw | | | | | | |
| 26     | Selective Radical Neck Dissection 2.5 | 0  0  0  0  2  1  1  1  2  2  2  2  2  2  2  1  1  1  1  8  7  6  6 | 4                  | |
|        | https://www.youtube.com/watch?v=5kgSj-wb2E&t=42s | | | | | | |
| 27     | Level II/IV Select Neck Dissection | 1  2  1  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  9  8  9 | 4                  | |
|        | https://www.youtube.com/watch?v=TaKG22w70kO | | | | | | |
| 28     | Selective neck dissection | 0  0  1  0  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  9  8  9 | 4                  | |
|        | https://www.youtube.com/watch?v=wOJ_iBauXk | | | | | | |
| 29     | Supra Omohyoid Neck Dissection - Dr. Subbaram Shanmugam, Chennai | 0  0  0  1  0  2  0  1  0  0  0  0  0  0  0  0  2  2  2  5  2  4  2 | 4                  | |
|        | https://www.youtube.com/watch?v=TEzhm6OVYuW | | | | | | |
| 30     | Modified radical neck dissection | 0  0  1  0  1  0  2  0  1  1  1  1  1  1  1  1  1  2  2  2  2  1  6  4  7  4 | 4                  | |
|        | https://www.youtube.com/watch?v=R6ogmzyjX8w | | | | | | |
| 31     | Neck Dissection II/IV Part 2: Level IIb | 0  0  0  0  2  2  2  2  2  2  2  2  2  2  2  2  2  1  2  2  9  7  8  8 | 4                  | |
|        | https://www.youtube.com/watch?v=hl_k77yjPkJ | | | | | | |
| 32     | Supra Omohyoid Neck dissection musl | 0  1  0  0  1  0  2  0  1  0  1  0  0  0  0  0  0  1  2  2  4  2  5  2 | 4                  | |
|        | https://www.youtube.com/watch?v=QED_RERtLU | | | | | | |
| 33     | Neck Dissection II/IV Part 1: Skin Flap | 0  0  0  0  2  2  2  2  2  2  2  2  2  2  2  2  2  1  2  2  9  7  8  8 | 4                  | |
|        | https://www.youtube.com/watch?v=VynN4c_w5ZuY | | | | | | |
| 34     | Supraomohyoid Neck Dissection | 0  1  0  0  1  2  2  1  1  1  2  1  1  2  2  2  2  1  1  1  1  6  8  6  5 | 4                  | |
|        | https://www.youtube.com/watch?v=Wa99yb9amvF | | | | | | |
| 35     | Neck Dissection II/IV Part 3: Level III | 0  0  0  0  2  2  2  2  2  2  2  2  2  2  2  2  2  1  2  2  9  7  8  8 | 4                  | |
|        | https://www.youtube.com/watch?v=UsVs2QGEC59 | | | | | | |
| 36     | Supraomohyoid neck dissection Dr Vijay Haribhakti | 0  1  0  0  1  2  1  2  1  2  1  2  2  2  2  1  1  1  1  6  8  5  7 | 4                  | |
|        | https://www.youtube.com/watch?v=0rya9Phrxt | | | | | | |
| 37     | Modified Radical Neck Dissection | 0  1  1  0  0  0  2  0  0  1  1  0  0  0  0  0  0  0  1  2  1  1  3  6  1 | 4                  | |
|        | https://www.youtube.com/watch?v=hzSgqfjik | | | | | | |
| Number | Title and Link | R1  | R2  | R3  | R4  | Subgroup |
|--------|----------------|-----|-----|-----|-----|----------|
| 1      | Selective neck dissection HD [Link](https://www.youtube.com/watch?v=ufQzvPuMedo) | High | High | Medium | High | High |
| 2      | Modified Radical Neck Dissection Part I, Dr John M Chaplin, Auckland, New Zealand [Link](https://www.youtube.com/watch?v=UFOpRMrUExw) | High | High | High | High | High |
| 3      | Neck Dissection Part 1, Dr. Gopinath [Link](https://www.youtube.com/watch?v=KvUHRA4XzuU) | Medium | Medium | Medium | Low | Medium |
| 4      | Neck Dissection from 3D Anatomy for Otolaryngology and Head and Neck Surgery [Link](https://www.youtube.com/watch?v=mlIDJi_VR58) | Medium | Medium | Medium | Medium | Medium |
| 5      | TOTAL LARYNGECTOMY WITH LEVEL II, III, IV NECK DISSECTION [Link](https://www.youtube.com/watch?v=3S9MBy8rkrWo) | Low | Medium | Medium | Medium | Medium |
| 6      | Complete Left Lateral Neck Dissection [Link](https://www.youtube.com/watch?v=R7Qsw5S5YJ0) | High | Medium | Medium | Medium | Medium |
| 7      | Part 2 of a Modified Radical Neck Dissection by Dr John Chaplin, Auckland, New Zealand. [Link](https://www.youtube.com/watch?v=i_A9fKdmlM) | High | High | High | Low | Medium |
| 8      | Functional neck dissection using the fascial plane technique: J Gavilán [Link](https://www.youtube.com/watch?v=sdqQxbZMJUA) | Medium | High | High | High | High |
| 9      | Radical Neck Dissection (HD): Head Neck Surgery- Dr Rajnish Talwar [Link](https://www.youtube.com/watch?v=AKBNSmWoIA) | Medium | High | Medium | Medium | Medium |
| 10     | Functional Neck Dissection [Link](https://www.youtube.com/watch?v=6iqTTULxvHM) | Low | Medium | Low | Low | Low |
| 11     | Right Selective Neck Dissection levels IIa-Vb. Audio Dr John M Chaplin, Auckland, New Zealand. [Link](https://www.youtube.com/watch?v=OyQPE6JX6xs) | Medium | Medium | Medium | Medium | Medium |
| 12     | Video Panel 1 Surgical Pearls for Neck Dissection — Management of the N0 Neck [Link](https://www.youtube.com/watch?v=TnGCDC93kM&ti=112s) | Medium | Medium | Medium | Medium | Medium |
| 13     | Functional Neck Dissection with Total Thyroidectomy- Berchtold Diathermy [Link](https://www.youtube.com/watch?v=ixRwv5TFVz) | Medium | Medium | Medium | Medium | Medium |
| 14     | Right Neck Dissection for Thyroid Cancer [Link](https://www.youtube.com/watch?v=vOh8oQCCz9g) | Medium | High | High | Medium | Medium |
| 15     | MODIFIED RADICAL NECK DISSECTION BY DR GUNJAN AGRAWAL [Link](https://www.youtube.com/watch?v=eqkB3s7JSA) | Low | Low | Medium | Low | High |
| 16     | RND: Radical Neck Dissection- Electrosurgery Video- Dr Rajnish Talwar [Link](https://www.youtube.com/watch?v=P7vBy8FBOpQ) | Medium | Medium | Medium | Medium | Medium |
| 17     | Modified Radical Neck Dissection type 3 (MRND) by Dr Sandeep Nayak, Bangalore [Link](https://www.youtube.com/watch?v=LimC2akK5DYk) | Medium | Medium | Medium | Medium | Medium |
| 18     | SUPRAOMOHYOID NECK DISSECTION [Link](https://www.youtube.com/watch?v=ncE88mJ4) | Medium | Medium | Medium | Medium | Medium |
| 19     | Radical Neck Dissection by Prof Rajaraman [Link](https://www.youtube.com/watch?v=nFKAS4UJP4) | Medium | Medium | Medium | Medium | Medium |
| 20     | Supraomohyoid Neck Dissection for buccomandibular squamous cell carcinoma [Link](https://www.youtube.com/watch?v=G8BPTHUMF8) | Low | Low | Medium | Low | Low |
| 21     | NECK DISSECTION step by step [Link](https://www.youtube.com/watch?v=L8u6YvAS0K8) | High | High | High | High | High |
| 22     | Lymph Node Dissection for Well-Differentiated Thyroid Cancer [Link](https://www.youtube.com/watch?v=vZiS17_jNM) | Medium | Low | Medium | Low | Medium |
| 23     | Selective Neck Dissection Level IIHV (Using the Fascial Plane) [Link](https://www.youtube.com/watch?v=3Mr8NH4bjOM&ti=13s) | High | Medium | High | Medium | Medium |
| Number | Title and Link | R1 | R2 | R3 | R4 | Subgroup |
|--------|----------------|----|----|----|----|----------|
| 24     | Video Panel 1 Surgical Pearls for Neck Dissection — Management of the Lateral Neck in Papillary T [https://www.youtube.com/watch?v=FryPUJxhZA](https://www.youtube.com/watch?v=FryPUJxhZA) | High | Medium | Medium | Medium | Medium |
| 25     | Comprehensive Left Lateral Neck Dissection [https://www.youtube.com/watch?v=9aWOSCTAexw](https://www.youtube.com/watch?v=9aWOSCTAexw) | High | Medium | Medium | Medium | Medium |
| 26     | Selective Radical Neck Dissection 2-5 [https://www.youtube.com/watch?v=Sog5FJwb2E&tl=42s](https://www.youtube.com/watch?v=Sog5FJwb2E&tl=42s) | Medium | Medium | Medium | Medium | Medium |
| 27     | Level II-IV Select Neck Dissection [https://www.youtube.com/watch?v=TdKQ22w70t0](https://www.youtube.com/watch?v=TdKQ22w70t0) | High | High | High | High | High |
| 28     | Selective neck dissection [https://www.youtube.com/watch?v=J-Oi_BexJXs](https://www.youtube.com/watch?v=J-Oi_BexJXs) | High | High | High | High | High |
| 29     | Supra Omohyoid Neck Dissection - Dr. Subbiah Shanmugam, Chennai [https://www.youtube.com/watch?v=TEdhm6OVutw](https://www.youtube.com/watch?v=TEdhm6OVutw) | Medium | Low | Medium | Low | Medium |
| 30     | Modified radical neck dissection [https://www.youtube.com/watch?v=R6gmzzyYxh8w](https://www.youtube.com/watch?v=R6gmzzyYxh8w) | Medium | Medium | Medium | Medium | Medium |
| 31     | Neck Dissection II-IV Part 2: Level IIb [https://www.youtube.com/watch?v=Jbh_k7FJyP](https://www.youtube.com/watch?v=Jbh_k7FJyP) | High | Medium | High | High | High |
| 32     | supra omohyoid Neck dissection mudit [https://www.youtube.com/watch?v=r0E_R-ERmU](https://www.youtube.com/watch?v=r0E_R-ERmU) | Low | Low | Medium | Low | Medium |
| 33     | Neck Dissection II-IV Part 1: Skin Flap [https://www.youtube.com/watch?v=V4c_w5sZuY](https://www.youtube.com/watch?v=V4c_w5sZuY) | High | Medium | High | High | High |
| 34     | Supraomohyoid Neck Dissection [https://www.youtube.com/watch?v=W0Af9b6omfc](https://www.youtube.com/watch?v=W0Af9b6omfc) | Medium | High | Medium | Medium | Medium |
| 35     | Neck Dissection II-IV Part 3: Level IIa-IV [https://www.youtube.com/watch?v=Us5x2QE0CS0](https://www.youtube.com/watch?v=Us5x2QE0CS0) | High | Medium | High | High | High |
| 36     | SupraOmohyoid neck dissection Dr Vijay Haribhakti [https://www.youtube.com/watch?v=Ogy999Ptvzl](https://www.youtube.com/watch?v=Ogy999Ptvzl) | Medium | High | Medium | Medium | Medium |
| 37     | Modified Radical Neck Dissection [https://www.youtube.com/watch?v=hsj5geqisk](https://www.youtube.com/watch?v=hsj5geqisk) | High | Low | Medium | Low | Low |
This study provides a detailed evaluation and analysis of 37 surgical videos on neck dissection, a key indicator case for trainees in otolaryngology, available on the free-to-access platform, YouTube, as of May 6, 2020. The videos combined for a total of approximately one million total views worldwide. Given the expansive reach and growing popularity of YouTube as an educational platform, it is imperative that current videos be verified for their educational utility and that future videos are produced with an emphasis on creating a repository of high-quality surgical education videos.

Objectively, using the LAP-VEGaS scoring criteria, the quality of the selected videos was very heterogeneous. Of the 24 of 37 (65%) of videos were rated as medium quality, while 10 of 37 (27%) of videos were rated as low quality. Only 3 of 37 (8%) of videos were rated to be high quality. While the popularity and relevance of YouTube is traditionally predicated on video characteristics such as total view count, date uploaded, number of likes, and number of dislikes, these video characteristics did not correlate with or predict the quality of videos. Interestingly, the authors found that attributes such as total view count and date uploaded (or video age) had no correlation with overall quality scores for neck dissection videos. While the L:D ratio had a mildly positive correlation with LAP-VEGaS scores, only the presence of narrated audio and/or annotated subtitles had a moderate positive correlation with LAP-VEGaS score. That said, it is widely accepted in the medical education literature that the utility of video instruction is maximized when audio narration is matched effectively to the video display.\(^\text{16}\)

The authors also found that videos produced by US-based physicians did not outperform videos produced by non-US-based surgeons, but videos produced by otolaryngology-trained physicians were statistically better than videos posted by surgeons trained in other surgical subspecialties. This speaks to the growing need for the otolaryngology community to expand their platform for e-learning by creating easy free-to-access, and high-quality video content. In fact, the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) and American Head and Neck Society (AHNS) do not presently provide educational surgical videos on key indicator cases in head and neck surgery such as neck dissection. They presently only provide videos on free and regional flap head and neck reconstruction.\(^\text{17}\) In a study on the importance of otolaryngology exposure in undergraduate medical education, Fung addresses the paucity of medical education tools designed to effectively teach otolaryngology; among his suggestions include heightened focus on bringing e-learning and simulation to the forefront of innovative curriculums.\(^\text{18}\) Tarpada et al. performed a systematic review of studies evaluating e-learning and otolaryngology and found that out of 12 studies, 9 reported either improved objective performance in academic or clinical measures, or no difference in performance but higher satisfaction with use of e-learning materials when compared to standard teaching methods.\(^\text{19}\) Hughes et al. discussed the challenges that exist in contemporary surgical education with producing skilled otolaryngologists while mitigating the effects of burnout and fatigue by suggesting the expansion of use of online platforms such as YouTube. They suggest user-generated otolaryngology-specific educational channels beneficial to the otolaryngology trainee, but caution viewers to validate the quality and content of these videos.\(^\text{20}\)

The current COVID-19 pandemic has accelerated the need for a robust e-learning platform for trainees in otolaryngology. A recent publication by Stanford University has highlighted the increased risks that otolaryngologists face due to their proximity to upper airway and mucosal structures.\(^\text{21}\) As a result, institutions across the nation have overhauled medical student and resident clinical rotations; for example, medical students have been removed from their clinical duties and residents are limited in their involvement in outpatient clinics and elective surgeries. Trainees in otolaryngology are largely

| Table 6. Factors Associated With Overall Video Quality |
|------------------------------------------------------|
| **Total Score** | **Subgroup Score** |
| p-value | Adjusted R² | p-value | Adjusted R² |
| US vs non-US | 0.06 | 0.06 |
| Otolaryngology vs non-Otolaryngology | <0.001* | <0.001* |
| View count | -0.03 | -0.02 |
| Video age | 0.01 | -0.01 |
| L/D ratio | 0.09 | 0.13 |
| Presence of audio/subtitles | 0.36 | 0.40 |

L/D = Likes/Dislikes,
* Statistically Significant,
supplementing their clinical education with remote virtual learning. However, this drastic change in the curriculum presents problems as Comer et al. predict that a 2-year cycle of resident education could be exhausted in less than 2 months if COVID-19-induced limitations persist.22 Multiple consortia in otolaryngology education have been established to continue otolaryngology resident education remotely in the setting of reduced clinical experience, limited educational resources, and limited in-person contact during the COVID-19 pandemic.23-25 AAO-HNS has also provided free access to AcademyU and Otosource for all residents through 2020. However, these resources have largely focused on providing remote lectures across multiple institutions as well as web-based learning modules. Few resources have been dedicated toward creating high-quality educational videos designed to help trainees improve their surgical acumen. As such, this study analyzes the existing repository of videos available on the free-to-access platform YouTube, and suggests a set of criteria important to creating high-quality surgical videos for the otolaryngology trainee. The authors hope that in creating guidelines for developing high-quality surgical videos, surgeons globally can create content that will augment the virtual otolaryngology curriculum for trainees.

**Study Limitations**

This study has a number of limitations. First, only videos on neck dissection available on YouTube were reported. While trainees report that their most widely used resource is YouTube, there are a variety of alternative resources including free-to-access and paid subscription videos that would require further analysis. Second, it is important to note that surgeons are not necessarily uploading their videos to YouTube for educational purposes; there is no requirement that content on YouTube be inherently educational. That is, it is not possible to determine the YouTube author’s original intent — authors can upload videos for any number of reasons that include, but certainly are not limited to marketing, entertainment, and education. Furthermore, it is difficult to assess the video author’s intended audience. Videos can potentially be targeted toward trainees, peers, and/or patients. Additionally, the validated survey instrument (LAP-VEGaS) used by the study authors was originally intended for grading the appropriateness of videos for submission for conferences and academic presentations. It is unlikely that the LAP-VEGaS criteria were known to authors uploading their videos to YouTube. As a result, video authors are graded against criteria that they likely did not incorporate or consider when creating their video content. Thus, it is important to note that these factors likely skew the perceived appropriateness for the videos’ specific use as an educational tool for trainees. That said, there is an implicit understanding that once a video is made public, viewership will follow and thus, it is important that stricter guidelines be used to produce high-quality educational content for viewers. Third, the guidelines laid out by the authors are limited by the judgment of the four reviewers; future endeavors should focus on establishing a panel of reviewers to create a validated tool for creating quality surgical videos.

**Future Directions**

In this study, the authors have assessed not only the existing quality and content of neck dissection videos on YouTube, but they have compiled an understanding of the qualities that dictate the educational value of a surgical video. Thus, the authors recommend that surgeons looking to create high-quality educational content for trainees in otolaryngology follow the attributes displayed in Table 7. First and foremost, videos should be of a live operation with a human subject; while cadaveric dissections provide educational value, it is more beneficial to the trainee to observe a live procedure. Videos should provide narrated audio or closed captioning to guide the viewer through the surgery; it is important to note that videos with voice-over narration are preferred to those with live operating room conversation. Surgeries should be performed and explained in a step-by-step manner that allows the viewer to understand the flow of the surgery. Surgeons should take care to name all relevant anatomy and structures; specifically, anatomy should be directly pointed to, annotated, or highlighted on the screen. Patient positioning as well as surgeon positioning should be reviewed and alluded to throughout the procedure (especially if the operating surgeon is changing vantage points). Surgeons should take care to ensure the field of view of the operating field is clear at all times; cameras should not zoom in too closely so as to obscure the global view, but they also should not zoom too far out so as to lose the finer details of the procedure.

**Table 7.** Key Attributes for a High-Quality Educational Surgical Video

| Attribute                                                                 |
|---------------------------------------------------------------------------|
| 1. Live operation with a human subject                                   |
| 2. Narrated audio or closed captioning in English language                |
| 3. Step-by-step procedure                                                 |
| 4. Names and annotates all relevant anatomy/structures                    |
| 5. High-definition, clear view of the operative field                    |
| 6. Time efficient (<20 minutes)                                          |
| 7. Title page that includes name of procedure, pathology, where it was performed, and name of the operating surgeon |
Videos should be time-efficient and would, ideally, range between 10 and 20 minutes. Finally, videos should include a title page that includes the name of the procedure, patient pathology, location of institutions, and the name of the operating surgeon.

CONCLUSIONS

Online videos of neck dissection represent an increasingly ubiquitous and appropriate resource for trainees in otolaryngology learning key indicator cases. Free-to-access video repositories, such as YouTube, have become increasingly popular among trainees as a primary resource for learning and preparing for surgical cases. In spite of this trend, videos on public domains are not subject to strict regulation and thus, vary widely in quality of content. During the COVID-19 pandemic when medical students, residents, and fellows are limited in their clinical exposure, virtual curriculums are becoming increasingly prevalent; the expectation is that the current pandemic will likely transform the way surgical education is delivered going forward. As such, future efforts should be taken to improve the breadth and depth of educational video content in otolaryngology by focusing on applying guidelines such as the LAP-VEGaS guidelines or following recommendations for creating high-quality educational video content.

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