



Educational value assessment of YouTube surgical videos of green light laser vaporization of the prostate

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Background: YouTube is commonly used by doctors to learn surgery. To date, no studies have evaluated the quality of videos on photoselective vaporization of the prostate (PVP) for benign prostatic hyperplasia (BPH) on YouTube. Our aim was to assess the educational value of YouTube videos regarding PVP.

Methods: “Green light laser vaporization of the prostate” and “photoselective vaporization of the prostate (PVP)” were searched by 2 authors on YouTube on February 14, 2022. Based on the Laparoscopic Surgery Video Educational Guidelines and previous studies, a checklist that included 4 major and 16 minor items was developed. SPSS version 26 (IBM Corp., Armonk, NY, USA) was used to analyze the data using correlation analysis.

Results: A total of 74 surgical videos were assessed. The mean number of days available for educational videos was 2,607 days (range, 156–5,854 days), with the earliest videos dating back to 2006 and the latest to 2021. The average length was 12.69 minutes (range, 0.73–123.7, SD 21.25). The majority of videos originated in the United States, and the video definition was divided into high, moderate, and low, accounting for 21.6%, 66.2%, and 12.2% of the videos, respectively. The average numbers of likes and dislikes for videos were 34.26 (SD 87.96) and 0, respectively. The average score of the videos was 6.65 (range, 2–12, SD 2.79). The correlation analysis indicated that the number of views of these videos was related to the number of online days and likes. The scores of videos were related to the number of likes, and the annual average number of views was related to both the number of views and the number of surgeon likes.

Conclusions: There is a lack of high-quality surgical videos of green laser vaporization of the prostate on YouTube. More detailed explanations of the key steps of the operation are needed. We hope that more videos with higher educational value will be published in the future to help surgeons master this technology.

Keywords: Greenlight laser vaporization of the prostate; photoselective vaporization of the prostate (PVP); quality assessment; surgical education

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Introduction

Benign prostatic hyperplasia (BPH) is diagnosed histologically. In clinical practice, it is characterized by lower urinary tract symptoms (LUTS), and it can lead to

complications, including acute urinary retention (1). A third of men over the age of 50 years will develop LUTS, and a quarter of LUTS in male patients over the age of 50 years will require surgical intervention. Investigators

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for the Olmsted County study showed that the chances for requiring surgery is highest in men over 65 years old who have severe symptoms and large prostates (2).

At present, the commonly used treatment methods for BPH include drug prescription, transurethral resection of the prostate (TURP), and thulium laser. However, compliance with medical treatment is poor, and there are many side effects, such as hypotension and lethargy. Patients with TURP often experience relapse, and the costs of operation are high. Thulium laser completely removes the transition zone (3), whereas green light laser selectively targets prostatic tissue to vaporize the hyperplastic prostate, which results in less intraoperative bleeding and shorter hospital stays. However, this new technology is not widely popular and only used by a few doctors (4). Barriers to teaching greenlight laser photoselective vaporization of the prostate (PVP) include lack of access to teaching hospitals for community surgeons and the poor reputation of video viewing (5). Fortunately, with the continuous progress of new media, video websites have become a more viable training tool. Therefore, learning this surgical technology online has become a potential learning method for surgeons. YouTube, a social media platform focusing on online videos, contains more than 7 billion videos that are readily available to the general public and free to watch. Creators from all over the world can upload videos to YouTube with no prerequisites or specific qualifications required (6).

To our knowledge, there is no professional supervision of the publication of videos, some videos do not have enough educational value, and the video quality is mixed, which makes it difficult for trainees to select appropriate videos to study. Considering this situation, we aimed to select high-quality surgical videos and provide references for follow-up surgical videos.

Methods

“Green light laser vaporization of the prostate” and “photoselective vaporization of the prostate (PVP)” were searched by two authors (SQ Yang and YZ Chen) on YouTube on February 14, 2022. The following inclusion criteria were applied to the identified videos: (I) the title or video should describe or include the main procedure and (II) the main procedure should be recorded completely. The exclusion criteria were as follows: (I) commercial advertisements; (II) promotional videos; and (III) cartoons. If the two authors could not agree on a video, a joint decision was made with the help of a third author (L

Peng). Because a standard and authoritative urological surgery video quality evaluation checklist does not exist, the Laparoscopic Surgery Video Educational Guidelines was used as a reference (7) in addition to a similar research scale of thulium laser enucleation of the prostate (8) to develop the final checklist, which is shown in *Table 1*. In addition to the researchers, 2 experienced urogynecologists, who had performed more than 200 prostate green laser vaporizations, assisted with the development of the checklist. The overall content of the list was consistent with previously published scales, while adjustments were made to the wording regarding surgical procedures and outcome measures. The standard procedure for PVP using the potassium-titanyl-phosphate (KTP) laser was taken from descriptions in the literature (9). Each subitem counted for 1 point out of a total of 16, with a higher score indicating a higher quality of video.

Data on the videos were collected, including the publication date, days online, region of origin, video definition (we regarded 1,080 P as high-, 720–480 P as moderate-, and 360–240 P as low-definition videos), length in minutes, number of views, and number of likes and dislikes. Data are shown in *Table 2*. Data were collected by the two authors (SQ Yang and YZ Chen) independently, and if there were any differences, the video was rescored by the same authors.

Statistical analysis

Data analysis was performed with SPSS v. 26 for Windows (IBM Corp., Armonk, NY, USA), and results are displayed in *Table 3*. The mean, range, and SD were recorded as the primary outcome measures, and Pearson correlation coefficient was calculated to evaluate the correlations among variables. Correlations were considered significant at $P < 0.05$ level (2 tailed).

Results

A total of 172 videos were screened. After viewing of the videos, 74 videos were selected for the final list based on the inclusion and exclusion criteria. The data on these videos are shown in *Table 2*. Regarding the primary outcome measure, the mean number of days available for educational videos was 2,607 days (range, 156–5,854 days), with the earliest videos dating back to 2006 and the latest to 2021. The average length was 12.69 minutes (range, 0.73–123.7, SD 21.25). The longest video received a score of 10, and

Table 1 Data on the checklist for evaluating the educational value of green light laser for prostate surgery videos

Items of checklist	N	%
Authors' details and video introduction		
1) Authors' details	36	48.7
2) Title of video includes name of the procedure	65	88.8
3) Conflict of interest disclosure	0	0
Case presentation		
4) Patient anonymity and privacy protection	74	100.0
5) Patient details	10	13.5
6) Preoperative workup and treatments	9	9.5
Demonstration of the surgical procedure		
7) Preoperative prostate volume	14	18.9
8) Introduction of equipment	9	9.5
9) Power of the green light laser	30	40.5
10) Anatomic demonstration	71	95.9
11) Video shows standardized step-by-step procedure	38	51.4
12) Emphasis of critical steps	18	24.3
13) Operating time	10	13.5
Other information about the videos		
14) Associated educational contents	22	29.7
15) Includes audio explanation	49	66.2
16) Includes subtitles	42	56.8

the shortest video obtained a score of 2. The majority of videos originated in the United States, followed by Spain. The video definition was divided into high, moderate, and low, accounting for 21.6%, 66.2%, and 12.2% of the videos respectively. The average numbers of likes and dislikes for videos were 34.26 (SD 87.96) and 0, respectively. We found that the largest number of videos were published in 2013, and the trends in the numbers of surgical videos published in consecutive years are shown in *Figure 1*.

The average score of the included videos was 6.65 (range, 2–12, SD 2.79). Five videos obtained a score of 12. A total of 51.3% of videos showed the standard surgical procedure. In addition, 24.3% of videos emphasized the critical steps of the surgery. As for the equipment, 12.1% of videos had a short introduction or picture of the green laser equipment, and 40.5% of videos demonstrated how to set the power parameters for the equipment. Only 9.0% of videos involved preoperative workup and treatments. In all, 29.7%

of the videos covered associated educational content that was unrelated to the learning needs of individuals watching the videos. In addition, 66.2% of videos included audio commentary.

The correlation analysis indicated that the number of views of these videos was related to the number of days online and the number of likes. The scores of videos were correlated with the number of likes, and the annual average number of views was associated with both the number of views and the number of likes. Moreover, average annual views were more strongly related to the number of likes than to the number of views. The correlation was significant at the 0.05 level (2-tailed). The results of the correlation analysis are shown in *Table 3*.

Discussion

This study evaluated the quality of videos by searching

Table 2 Characteristics of reviewed surgical videos on green light laser vaporization of the prostate on YouTube

Title	Date of upload (year/month/day)	Region	Days online	Definition	Views	No. of likes	No. of dislikes	Score	Length (min)	Mean annual views
Greenlight Laser for Enlarged Prostate	2021/5/30	Australia	262	1,080	8665	198	0	12	5.52	8,665
Laser Vaporization of the Prostate	2016/9/2	Unknown	1,993	720	62,599	163	0	12	2.23	12,519.8
Greenlight Photoselective Vaporization of the Prostate	2013/6/6	Spain	3,177	480	1305	1	0	12	3.92	145
Photoselective Vaporization of the Prostate (PVP) Laser Therapy for BPH	2013/1/19	Unknown	3,315	480	36076	329	0	12	11.9	4,008.44
Green Light Laser Vaporization of the Prostate	2021/6/22	UK	239	720	175	4	0	12	23.65	175
GreenLight XPS 180W Prostate Laser Treatment of Male BPH (Benign Prostatic Hyperplasia)	2011/4/12	Canada	3,963	480	58,328	152	0	11	8.9	5,302.55
Enlarged Prostate Surgery for BPH Treatment With GreenLight Laser PVP from www.williamsurology.com	2011/5/23	Unknown	3,922	480	155,594	234	0	11	8.12	14,144.91
Greenlight Laser Vaporization	2018/1/11	Unknown	1,497	480	76	2	0	11	10.03	19
Greenlight Laser Treatment for Benign Prostatic Hyperplasia (BPH)	2021/2/8	Unknown	373	1,080	1459	23	0	10	6	1,459
Greenlight Laser Intervention for Benign Prostate Hyperplasia (BPH)	2016/7/5	Unknown	2,052	480	3672	9	0	10	14.33	612
GreenLight XPS™ Laser Therapy System: Bladder Neck Vaporization Surgical Video Clip	2018/10/31	Unknown	1,204	720	4677	0	0	10	6.23	1,169.25
Basics of GreenLight Laser Prostatectomy	2021/9/13	Australia	156	1,080	669	39	0	10	2.85	669
Anatomic Photoselective Vaporization of the Prostate (PVP) with GreenLight XPS 180W by Dr Rijo	2017/7/4	Unknown	1,688	720	4817	28	0	9	9.35	963.4
Technique and Short Time Outcome of GreenLight Laser (KTP, 80 W) Vaporisation of the Prostate	2011/1/27	Unknown	4,038	360	9292	30	0	9	13.15	844.73
GreenLight Laser Vaporization of the Prostate for Urolift Failure	2021/9/1	Unknown	168	480	315	2	0	9	2.47	315
GreenLight Laser Surgery for Prostate	2009/8/23	Unknown	4,560	240	126,282	57	0	9	1.98	9,714
Ejaculation-Preserving Photoselective Vaporization of the Prostate (EP-PVP) by Dr Rijo	2017/11/18	Unknown	1,551	720	73800	85	0	9	7.37	14,760
Photo-vaporisation prostatique au laser Greenlight	2014/2/9	Unknown	2,929	720	68,870	47	0	9	5.18	8,608.75
Greenlight PVP - Photoselective Vaporization of the Prostate	2006/2/6	Spain	5,854	240	49,611	31	0	9	6.65	3,100.69
GreenLight HPS Laser Prostatectomy 130 grams	2006/12/11	Spain	5,546	360	46,562	19	0	9	3.23	2,910.13
New GreenLight Laser PVP Treatment for BPH	2008/8/14	USA	4,934	480	30,311	23	0	9	6.7	2,165.07
Green Light Laser Vaporization of the Enlarged Prostate	2008/9/5	USA	4,912	480	25,540	20	0	8	9.42	1,824.29
Anatomic PVP with the GreenLight XPS 180 Watt Laser	2012/6/12	Spain	3,536	480	20,252	64	0	8	35.63	2,025.2
Vaporização da próstata com GreenLight LASER 180W	2017/9/27	Portugal	1,603	720	16,779	455	0	8	13.9	3,355.8
GreenLight Laser Surgery for BPH	2009/4/20	Unknown	4,685	480	12,796	11	0	8	7.25	984.31
GreenLight PVP Laser	2007/11/26	Unknown	5,196	240	10,163	0	0	8	3.92	677.53
Greenlight HPS Photoselective Vaporization of the Prostate	2006/10/9	Spain	5,609	480	8,262	7	0	8	1.73	516.38
Sentara Green Light Laser Therapy for Enlarged Prostate	2010/11/4	Unknown	4,122	360	6,806	9	0	8	3.23	567.17
GreenLight XPS™ Laser Therapy System: Vaporization to Capsule Video Clip	2018/10/31	USA	1,204	720	5,913	0	0	8	5.15	1,478.25
Greenlight Laser Surgery Miami Urology BPH Specialist David Robbins MD Urologist	2011/7/11	Unknown	3,873	480	5,757	3	0	7	2.25	523.36
Anatomic Photoselective Vaporization of the Prostate with GreenLight XPS 180W by Dr. Rijo (unedited)	2015/11/9	USA	2,291	720	4,238	411	0	7	47.83	605.43
Prostate KTP-Laser Vaporization	2010/3/17	Unknown	4,354	480	3,895	3	0	7	9.48	324.58
New GreenLight Laser PVP Treatment for BPH	2008/8/20	USA	4,928	480	2,876	2	0	7	6.97	205.43
Greenlight XPS 180W Unedited Case Video Presentation 65 g Prostate Size with Median Lobe- Trilobar	2013/9/17	Unknown	3,074	480	2,449	3	0	7	58.08	272.11
Comparing GreenLight and DIOLAS LFD 3000 (BPH - Benign Prostatic Hyperplasia)	2009/10/7	Germany	4,515	480	2,243	1	0	7	2.67	172.54
GreenLight HPS on a post-Brachytherapy Prostate	2009/7/29	Unknown	4,585	480	1,988	2	0	6	4.7	152.92
Greenlight HPS Laser Prostatectomy: Median Lobe Enucleation for a 100 cc Prostate & Bladder Stones	2009/10/7	Unknown	4,515	240	1,856	3	0	6	5.48	142.77

Table 2 (continued)

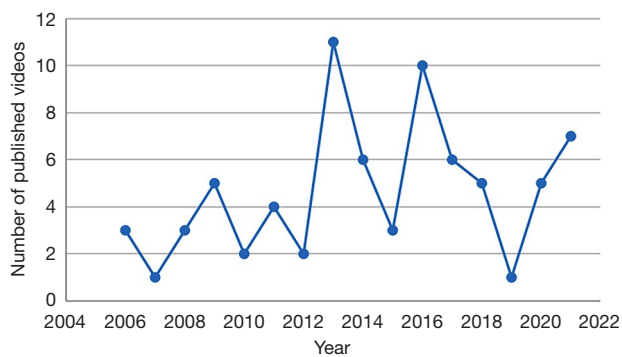
Table 2 (continued)

Title	Date of upload (year/month/day)	Region	Days online	Definition	Views	No. of likes	No. of dislikes	Score	Length (min)	Mean annual views
Greenlight Pvp Laser I Laser Surgery for Prostate Enlargement in India	2020/3/1	India	717	240	1,636	21	0	6	1.05	818
Laser et Urologie - Vaporisation Greenlight - Prostate - Saint Jean de Dieu - Clinique Oudinot	2014/1/31	France	2,938	1,080	1,444	0	0	6	4.68	180.5
Greenlight XPS 180W Unedited Case Video Presentation 150 g Prostate SIZE	2013/9/16	Unknown	3,075	480	1,240	6	0	6	123.72	137.78
Vaporization with GreenLight Laser XPS 180 W	2013/7/24	Unknown	3,129	480	1,022	1	0	6	5.35	113.56
Dr Himesh Gandhi Introduces Green Light Laser Surgery for Prostate	2017/12/6	Unknown	1,533	240	948	2	0	6	4.85	189.6
Prostate Enucleo Vaporization, Physician doct. Dadone Claudio	2013/10/18	Unknown	3,043	1,080	693	1	0	6	7.33	77
Greenlight XPS Laser TUVF	2014/1/24	Unknown	2,945	240	665	1	0	6	3.7	83.13
Greenlight XPS Prostate Vaporization 75cc	2013/2/1	Unknown	3,302	240	637	1	0	5	4.93	70.78
Photoselective Vaporisation of the Prostate (PVP) with GreenLight Laser (GLL)	2012/3/3	Unknown	3,637	240	603	0	0	5	1.55	60.3
GreenLight™ Laser PVP	2016/5/5	Unknown	2,113	1,080	560	1	0	5	48.67	93.33
Vaporisation de Prostate par Laser GreenLight	2013/10/19	Unknown	3,042	480	549	1	0	5	29.35	61
Laser Vaporization of the Prostate KTP GreenLight HPS5	2016/5/10	Unknown	2,108	480	434	0	0	5	11.95	72.33
Adenome Prostate Vaporization Laser GreenLight Hupertan Bichat	2014/10/21	Unknown	2,675	480	434	0	0	5	3.43	54.25
GreenLight Laser Vaporization of the Enlarged Prostate	2015/5/11	Germany	2,473	480	350	5	0	5	9.42	50
Laser Vaporization of the Prostate KTP GreenLight HPS1	2016/5/10	Unknown	2,108	480	314	0	0	5	12	52.33
Anatomical Vaporization, Physician doct. Crivellaro Simone.	2013/10/17	Italy	3,044	144	303	0	0	5	5.28	33.67
Highly Powered GreenLight Laser Vaporisation of the Prostate	2020/1/27	Unknown	751	480	297	12	0	5	1.1	148.5
GreenLight Photoselective Vaporisation of the Prostate	2013/8/2	Unknown	3,120	240	286	1	0	5	5.33	31.78
Core Videos (2017): Photoselective Vaporization of the Prostate (PVP)	2021/3/5	USA	348	1,080	249	5	0	5	13.28	249
GreenLight XPS – Step 7 - Dr. Zorn – How I do it 2014	2014/10/6	Unknown	2,690	480	214	0	0	4	3.55	26.75
Photoselective Vaporization of the Prostate and Cystolitholapaxy	2016/1/12	Unknown	2,227	480	204	0	0	4	112.23	34
GreenLight Laser - Vaporisation de la Prostate	2014/11/6	Unknown	2,659	720	191	1	0	4	1.33	23.88
Vaporisation de Prostate au Laser GreenLight	2019/12/3	Unknown	806	1,080	176	1	0	4	9	58.67
GreenLight Laser Vaporization of the Enlarged Prostate	2015/6/21	Germany	2,432	360	173	2	0	4	6.18	24.71
Anatomical Vaporization, Physician doct. Gomez Sancha	2013/10/25	Unknown	3,036	480	169	0	0	4	11.95	18.78
Laser Vaporization of the Prostate KTP GreenLight HPS6	2016/5/10	Unknown	2,108	480	150	0	0	4	1.2	25
Prostate Laser Vaporization	2018/1/15	Unknown	1,493	480	104	1	0	3	0.73	26
GreenLight (KTP,80W) Vaporization of a 80 gr Prostate by Omer OGE, MD, Izmir	2017/5/25	Unknown	1,728	480	79	0	0	3	5.83	15.8
Green Laser Vaporization of Enlarged Prostate	2016/8/17	Unknown	2,009	480	72	0	0	3	50.62	12
GreenLight XPS™ Laser Therapy System - Classic Vaporization 60g	2018/12/13	USA	1,161	1,080	69	0	0	3	4.38	17.25
GreenLight Laser PVP for Enlarge Prostate Urology Photoselective Vaporization of Prostate	2020/5/8	Unknown	649	360	65	0	0	3	21.93	32.5
Green Light Laser Vaporization	2017/10/18	Unknown	1,582	720	65	0	0	3	1.05	13
Vaporisation Adénome de Prostate Laser Greenlight/Clinique Saint Jean Montpellier	2021/1/8	Unknown	404	720	59	1	0	3	0.82	59
Laser Vaporization of the Prostate KTP GreenLight HPS2	2016/5/10	Unknown	2,108	480	56	0	0	3	11.97	9.33
GreenLight XPS™ Laser Therapy System Bladder Neck Vaporization Surgical Video - Boston Scientific	2020/9/25	Unknown	509	720	49	0	0	2	6.23	24.5
Laser Vaporization of the Prostate KTP GreenLight HPS4	2016/5/10	Unknown	2,108	480	37	0	0	2	11.95	6.17
Green Light Laser of Prostate	2020/3/27	Unknown	691	720	23	1	0	2	3.95	11.5

Table 3 Correlation analysis of factors associated with quality scores

Factors	Days online	Views	Likes	Score	Length	Average annual views
Days online	1					
Views	0.320**	1				
Likes	-0.20	0.397**	1			
Score	0.186	0.152	0.255*	1		
Length	-0.025	-0.109	0.065	0.137	1	
Average annual views	0.083	0.874**	0.483**	0.154	-0.116	1

*, correlation significant at the 0.05 level (2-tailed); **, correlation significant at the 0.01 level (2-tailed).

**Figure 1** Trends in surgical videos published in consecutive years.

YouTube for educational videos on green light lasers for prostate surgery to identify videos that have pedagogical value, to determine deficiencies of the videos, and to provide a reference for higher-quality videos. To the best of our knowledge, this is the first study to appraise the quality of existing green light laser videos on YouTube, and it is also the first to use our modified checklist to evaluate the quality of videos on these surgical procedures.

With the advent of the information era and the continuous development of multimedia, doctors have better access to the learning resources they need. Thanks to the release of the Laparoscopic Surgery Video Educational Guidelines, several studies have already been undertaken to evaluate the quality of videos of abdominal surgery, thus providing a template for the evaluation of such videos (10-12). Nevertheless, a small number of studies (10-13) have shown that such videos are generally not highly rated, the relevant educational components are incomplete, and the educational value is not sufficiently high to meet the standards for a surgical teaching video. YouTube, a video-sharing website, still lacks professional video reviews, resulting in the

publication of many unprofessional videos, which may have counterproductive effects.

The checklist developed as part of this study was undoubtedly critical to effectively assessing the video quality. Previous articles associated with laparoscopic surgery were also based on checklists, and these previous checklists were adapted for the current study according to these authors' suggestions. There were several reasons why we chose to assess the quality of the green light laser videos rather than those relating to thulium laser enucleation of the prostate: (I) the wavelength of greenlight laser is 532 to 556 nm; (II) the absorption coefficient for hemoglobin is very high, thus minimizing bleeding during surgery; (III) the scope of thermal damage is relatively small; (IV) the risk of capsular perforation or peripheral organ damage is low, and as such, recovery is faster; (V) the surgery vaporizes the prostate, and, thus, there will be no prostate specimen; (VI) the patient usually does not need an indwelling catheter; and (VII) most patients can leave the hospital on the day of surgery.

However, the vast majority of videos still fall short of the requirements for a high-quality surgical teaching video, with only 24.3% explaining the critical steps in detail. Correlation analysis showed that many factors were not associated with video scores. Only the number of likes correlated with scores, which may be because the number of likes represents the quality of videos. Surprisingly, we found that average annual views were significantly correlated with likes and views.

This study has several limitations. The search scope of our videos was limited to YouTube, and the search strategy for green light laser of the prostate should be applied to other websites to capture relevant videos more comprehensively. YouTube is a well-known video-sharing platform, which has a low registration threshold and a large

global audience. Therefore, we hope that an increasing number of urologists will share their surgical procedures to help trainees. In addition, the sound quality of English audio commentary was inconsistent, thus making it difficult for viewers to learn the surgery, and 33.8% of videos did not have any audio commentary. Moreover, we found it difficult to assess whether the videos contained accurate descriptions of key surgical steps, as we could not identify any suitable video evaluation standards that could be followed. Although we produced a checklist based on previous articles and guidelines, more expert advice is needed to develop an authoritative checklist.

Conclusions

YouTube lacks high-quality educational surgical videos of green laser vaporization of the prostate, and more detailed explanations of the key steps of the operation are needed. We hope that more videos with higher educational value can be published in the future to help beginners master this technology.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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