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Wedge Versus Linear Labiaplasty: Comparative Effects on Sexual Function, Genital Self-Image, and Patient Satisfaction

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ABSTRACT

Purpose: Labiaplasty has become one of the most frequently performed procedures in female genital cosmetic surgery due to increasing aesthetic awareness, functional complaints, and concerns related to sexual well-being. Although wedge and linear (trim) resections are the most commonly used techniques, comparative data addressing their outcomes, particularly sexual function and genital self-image, remain limited. Thus, the aim was to compare clinical, psychosexual, and patient-reported outcomes following wedge or linear labiaplasty and to identify factors associated with postoperative satisfaction and complications.

Methods: This prospective comparative study included women who underwent labiaplasty at a tertiary referral center between 2025 and 2026. Patients were allocated to either the wedge or linear technique group according to surgeon preference and anatomical suitability of the labial morphology. Demographic characteristics, operative variables, and postoperative complications were recorded. Genital self-image and sexual function were assessed preoperatively and at the 6-month postoperative follow-up using validated instruments: the female genital self-image scale (FGSIS) and the female sexual function index (FSFI). Within-group and between-group comparisons were performed using appropriate parametric statistical tests.

Results: The cohort consisted of 94 women, split equally between the wedge (n=47) and linear (n=47) groups. Both techniques resulted in significant postoperative improvements in genital self-perception and sexual function. FGSIS and FSFI scores increased significantly in both groups (all $p<0.001$). Operative time was longer in the wedge group, whereas the linear technique was associated with shorter procedures but higher rates of aesthetic dissatisfaction. Wound dehiscence occurred more frequently following wedge resection. No significant differences were observed between groups regarding postoperative total FGSIS or FSFI scores.

Conclusion: Both wedge and linear labiaplasty provided meaningful functional and psychosexual benefits. However, each technique was associated with distinct complication profiles and aesthetic trade-offs. Surgical success appeared to depend more on individualized patient selection and tailored operative planning than on the surgical technique itself. A patient-centered, anatomy-based approach is essential to optimize safety, satisfaction, and long-term outcomes.

Keywords: Labiaplasty, vulva, body image, sexual behavior, female genitalia

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INTRODUCTION

Female genital cosmetic surgery has become increasingly prevalent over the past two decades, paralleling the growing awareness of genital aesthetics, the desire to address functional complaints, and the heightened emphasis on sexual well-being. Among these procedures, labiaplasty represents one of the most frequently performed female genital cosmetic surgical interventions worldwide. Women commonly seek labiaplasty due to labia minora hypertrophy, asymmetry, recurrent vulvar or labial infections, discomfort during daily activities or sexual intercourse, and dissatisfaction with genital appearance.[1]

Previous studies have demonstrated that dissatisfaction with genital appearance may negatively influence body image, sexual self-confidence, and overall sexual satisfaction. Although numerous surgical techniques for labiaplasty have been described, wedge resection and linear (trim) resection remain the most commonly utilized approaches.[2-4]

The linear technique is technically simpler and aims to reduce postoperative complication rates but it may disrupt the natural contour and edge of the labia.[5] In contrast, the wedge technique preserves the natural labial margin, pigmentation, and anatomical contour, thereby potentially providing superior aesthetic and functional outcomes. Nevertheless, wedge resection has been associated with specific complications, particularly wound dehiscence. This method involves excision of a wedge-shaped segment of labial tissue, allowing restoration of a more physiological and natural contour compared with straight-line resections.[4]

Despite the widespread use of both techniques, studies evaluating their effects on sexual function and genital self-image using validated assessment tools remain limited. The current literature stresses that genital aesthetic surgery should not be evaluated solely on anatomical outcomes but rather within a multidimensional framework of sexual health.[3] This recommendation highlights the importance of assessing a combination of individual patient sexual well-being, psychosocial changes and relational outcomes following genital surgery. In line with this, current research has demonstrated a strong correlation between genital self-image and sexual function, showing that post-operative improvements in aesthetic satisfaction significantly enhance various dimensions of sexual health, including desire and arousal.[6]

Furthermore, concomitant clinical and individual factors have been reported to adversely influence postoperative outcomes, highlighting appropriate patient selection as a critical determinant of surgical success and reduced complication rates.[7] Therefore, comprehensive preoperative counseling should include detailed discussions of potential complications, anticipated functional and aesthetic benefits, and normal anatomical variations, with the aim of establishing realistic patient expectations.[8] Careful planning and individualization of the surgical technique are also essential to minimize perioperative and postoperative complications, optimize postoperative sexual function, and enhance overall patient satisfaction.

Given this background, the aim of the present study was to comparatively evaluate postoperative genital self-image, sexual function, psychosexual outcomes, and complication profiles following wedge or linear labiaplasty. A further aim was to identify clinical and demographic factors associated with surgical outcomes.

METHODS

This prospective comparative study included women who underwent labiaplasty at a single tertiary referral center between 2025 and 2026. The study protocol was approved by the İstanbul Medipol University Non-Interventional Clinical Research Ethics Committee (approval number: 1131, date: 11.09.2025). All procedures were conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to enrollment.

Patients were allocated to either the wedge or linear technique group according to surgeon preference and anatomical suitability of the labial morphology. Therefore, this study should be considered a prospective comparative cohort study rather than a randomized controlled trial. All procedures were performed by two surgeons with extensive experience in genital aesthetic surgery; one surgeon had more than 5 years of experience and had performed over 100 labiaplasty procedures, while the other had more than 10 years of experience and had performed over 200 labiaplasty procedures. Women undergoing labiaplasty for functional and/or aesthetic indications were eligible for inclusion. Patients with incomplete clinical records or missing preoperative or postoperative questionnaire data were excluded from the analysis.

Demographic and baseline clinical characteristics were systematically recorded, including age, gravida, parity, smoking status, and the presence of systemic comorbidities. Obstetric history and mode of delivery were documented. Preoperative genital examination included evaluation of labial anatomy, classification of labial morphology, and assessment of asymmetry. Surgical variables comprised operation duration, primary indication for surgery (functional complaints, aesthetic concerns, or hypertrophy), concomitant procedures such as hoodoplasty or labia majora interventions, detailed description of the surgical technique, suture material, and energy modality used.

Postoperative outcomes were assessed during scheduled follow-up visits. Representative pre- and postoperative (first month) clinical photographs of four patients are presented in Figures 1 and 2. Complications were defined and recorded as surgical site infection, wound dehiscence, hematoma, scar contracture, and patient-reported dissatisfaction. Patient-reported outcome measures were used to evaluate both genital self-perception and sexual function. Female genital self-image was assessed using the female genital self-image scale (FGSIS),[9,10] a validated questionnaire measuring women's perceptions of genital appearance, comfort, and confidence, with higher scores reflecting a more positive self-image. Sexual function was evaluated using the female

sexual function index (FSFI),[11,12] a validated multidimensional instrument assessing six domains: desire; arousal; lubrication; orgasm; satisfaction; and pain. Both domain-specific and total scores are calculated. Identical validated versions of both instruments were administered preoperatively and at the sixth month postoperatively to ensure consistency and comparability of outcomes; FGSIS and FSFI scores were evaluated and compared during these time periods. No patients were lost to follow-up, and all participants completed the 6-month postoperative assessment.

Figure 1. Preoperative, Intraoperative and postoperative (first month) photographs of wedge labiaplasty patients

Figure 2. Preoperative, Intraoperative and postoperative (first month) photographs of linear labiaplasty patients

Statistical Analysis

Sexual function and genital self-perception were evaluated using validated, standardized patient-reported outcome instruments. The FSFI is a 19-item multidimensional questionnaire assessing six domains of female sexual function: desire, arousal, lubrication, orgasm, satisfaction, and pain. Domain scores are weighted and summed to generate a total score ranging from 2 to 36, with higher scores indicating better sexual function. Consistent with previously validated thresholds, a total FSFI score below 26.55 was considered indicative of sexual dysfunction.

Genital self-image was assessed using the FGSIS, a validated 7-item instrument designed to evaluate women's perceptions, comfort, and satisfaction regarding their genital appearance. Each item is rated on a 4-point Likert scale ranging from strongly agree to strongly disagree, yielding a total score between 7 and 28. Higher scores reflect a more positive genital self-image.

Sample size calculation was performed using G*Power software (version 3.1, Heinrich Heine University, Düsseldorf, Germany). Based on an expected large effect size (Cohen's d=0.8), a statistical power of 95%, and a significance level of 0.05, the required total sample size was calculated as 84 patients (42 per group).

All statistical analyses were performed using IBM SPSS Statistics version 25 (IBM Corp., Armonk, NY, USA). Categorical variables are summarized as frequencies and percentages, whereas continuous variables are presented as means with standard deviations. Changes between preoperative and postoperative FSFI and FGSIS scores were evaluated using paired-samples t-tests. All statistical tests were two-tailed, and a p value of <0.05 was considered statistically significant.

RESULTS

A total of 94 women were included with 47 in both the wedge and linear groups, thus ensuring adequate statistical power. The demographic and clinical characteristics of the study population are summarized in Table 1. The mean age was 39.3±5.6 years in the wedge labiaplasty group and 34.7±7.7 years in the linear labiaplasty group. The prevalence of smoking was 31.9% in the wedge group and 36.2% in the linear group. According to the labia minora morphological classification, type 1 morphology was bilaterally predominant in the wedge group, whereas type 2 morphology was the most frequently observed pattern in the linear group. Labial asymmetry was identified in 46.8% of patients undergoing wedge labiaplasty and 38.3% in those undergoing the linear procedure (Table 1).

Comparison of surgical characteristics demonstrated that the mean operative time was longer in the wedge group compared to the linear group (94.6±26.9 minutes vs. 80.7±31.7 minutes). With respect to surgical indications, aesthetic concerns constituted the primary motivation in the wedge resection group (80.8%), whereas labial hypertrophy was the most commonly reported indication in the linear resection group (85.1%). Among patients undergoing concomitant labia majoraplasty, hyaluronic acid injection was the most

frequently preferred adjunctive treatment in the wedge group (85.1%), while lipid-based filler application predominated in the linear labiaplasty group (56.7%). Lateral hoodoplasty was the most commonly performed hoodoplasty technique in both groups. Regarding surgical instrumentation, wedge resections were typically performed using scissors or a scalpel, whereas linear resections were most commonly carried out using electrocautery.

An analysis of the surgical complications reveals that the most frequent issue in the wedge labiaplasty group was dehiscence (wound separation), occurring in 10.6% of cases (n=5). In addition, this group experienced infection, hematoma, and patient dissatisfaction, each at a rate of 4.2% (n=2). In contrast, the linear labiaplasty group reported no instances of dehiscence or infection. However, complications in the linear group included contracture (2.1%, n=1), hematoma (2.1%, n=1), and dissatisfaction (4.2%, n=2), along with a 4.2% (n=2) rate of complications related to labia majoraplasty, such as edema, infection, or hematoma. Despite these numerical variations, statistical analysis indicated that there were no significant differences between the two techniques regarding infection ($p=0.5$), dehiscence ($p=0.1$), hematoma ($p=0.6$), or patient dissatisfaction ($p=0.9$) (Table 2).

Functional and psychosexual outcomes demonstrated significant postoperative improvements in both cohorts. Total scores of the FGSIS increased significantly from 10.9±1.9 preoperatively to 25.6±1.3 postoperatively in the Wedge group and from 11.5±1.8 to 25.7±2.1 in the linear group (both $p<0.001$). Similarly, the FSFI total scores showed marked improvement, rising from 14.9±3.1 to 28.3±3.0 in the wedge group and from 12.3±2.4 to 27.4±4.1 in the linear group (both $p<0.001$).

Analysis of FSFI domain scores revealed statistically significant improvements across all subdomains in both groups when preoperative and postoperative values were compared ($p<0.05$) (Table 3). Between-group comparisons demonstrated no significant differences in either preoperative or postoperative FGSIS total scores. However, preoperative FSFI total scores differed significantly between the groups. At the domain level, significant differences were observed in all preoperative parameters except satisfaction and pain, whereas postoperatively only the satisfaction domain showed a statistically significant difference between the groups (Table 3).

Additional analyses of postoperative change scores demonstrated that the mean ΔFGSIS scores were comparable between the wedge and linear groups (14.7±2.1 vs. 14.2±2.5, respectively; $p=0.30$). In contrast, the improvement in sexual function, as assessed by the ΔFSFI total score, was significantly greater in the linear group than in the wedge group (15.1±4.4 vs. 13.3±3.7, respectively; $p=0.03$).

Overall analyses further demonstrated that patients with a previous cesarean delivery achieved significantly greater improvements in FSFI total scores than those with a history of vaginal delivery (ΔFSFI: 15.1±4.3 vs. 12.9±3.6, $p=0.007$), whereas ΔFGSIS scores did not differ significantly according to mode of delivery (14.6±2.3 vs. 14.2±2.3, $p=0.43$).

Table 1. Demographic data of patients

		Wedge labiaplasty group (n=47)	Linear labiaplasty group (n=47)	*p*
		Mean ± SD	**Mean ± SD**	
Age		39.3±5.6	34.7±7.7	0.01*
Gravida		2.1±1.0	1.6±1.1	0.02*
Parity		1.9±0.9	1.4±1.0	0.02*
		(%)	**(%)**	
Mode of delivery	**Vaginal birth**	63.8	21.3	
	C-section	36.2	78.7	<0.001*
	None			
Smoking		31.9	36.2	0.38
Left labium minor classification	**Type 1**	53.1	29.8	
	Type 2	42.5	53.2	0.02*
	Type 3	4.2	17	
Right labium minor classification	**Type 1**	55.3	29.8	
	Type 2	38.2	57.4	0.02*
	Type 3	7.5	12.8	
Presence of asymmetry	**Present/ observed**	46.8	38.3	0.07
Hypertension		4.2	0	0.26
Obesity		4.2	0	0.26

*Chi-square test, statistically significant $p<0.05$
SD: Standard deviation

Table 2. Surgical characteristics of the groups

		Wedge labiaplasty group (n=47)		Linear labiaplasty group (n=47)		*p*
		Mean ± SD	(%)	Mean ± SD	(%)	
Operation duration (min)		94.6±26.9		80.7±31.7		0.02
Reason for operation	**Hypertrophy**	36	76.5	40	85.1	0.9
	Functional	26	55.3	30	63.8	
	Aesthetic concer	38	80.8	36	76.5	
L. majoraplasty technique	**Hyaluronic acid**	40	85.1	12	26.7	
	Lipid filler	6	12.7	27	56.7	<0.001
	Surgery	1	2.1	8	16.7	
Hoodoplasty technique	**Lateral hoodoplasty**	45	95.7	40	83.3	
	Central hoodoplasty	2	4.3	7	16.7	0.11
Suture material	**4.0**	5	10.7	21	44.6	
	5.0	42	89.3	26	55.4	<0.001
Energy modality used	**Cautery**	5	10.7	39	82.9	
	Cold	42	89.3	8	17.1	<0.001
Complications observed in labium minoraplasty	**Infection**	2	4.2	0	0	0.5
	Dehiscence	5	10.6	0	0	0.1
	Contracture	0	0	1	2.1	0.9
	Hematoma	2	4.2	1	2.1	0.6
	Dissatisfaction	2	4.2	2	4.2	0.9
Complications observed in L. majoraplasty	**Edema, infection, hematoma**	0	0	2	4.2	0.8

SD: Standard deviation

Table 3. Evaluation of FGSIS and FSFI scores before and after surgery

		Wedge labiaplasty group (n=47)				Linear labiaplasty group (n=47)			
		Before surgery mean ± SD	**After surgery mean ± SD**	**Within group *p****	**Between groups before surgery *p*****	**Before surgery mean ± SD**	**After surgery mean ± SD**	**Within group *p****	**Between groups after surgery *p*****
FGSIS total score		10.9±1.9	25.6±1.3	<0.001*	0.14	11.5±1.8	25.7±2.1	<0.001*	0.74
FSFI	**Desire**	2.2±0.6	4.7±0.8	<0.001*	0.02**	1.9±0.5	4.3±1.3	<0.001*	0.06
	Arousal	2.2±0.5	4.7±0.7	<0.001*	<0.001**	1.7±0.6	4.4±1.1	<0.001*	0.1
	Lubrication	2.3±0.7	4.4±0.8	<0.001*	0.005**	1.8±0.9	4.5±0.9	<0.001*	0.7
	Orgasm	2.1±0.9	4.6±0.8	<0.001*	<0.001**	1.9±0.6	4.8±0.8	<0.001*	0.2
	Satisfaction	2.4±0.9	5.1±0.6	<0.001*	0.2	2.1±1	4.5±0.9	<0.001*	<0.01**
	Pain	3.6±1.2	4.6±0.7	<0.001*	0.9	3.7±2.4	4.4±1.4	0.04*	0.5
	FSFI total score	14.9±3.1	28.3±3	<0.001*	<0.001**	12.3±2.4	27.4±4.1	<0.001*	0.2

*Paired samples t test, statistically significant ($p<0.05$), **Independent Samples t test, statistically significant ($p<0.05$)
FGSIS: Female genital self-image scale, FSFI: Female sexual function index

Similarly, patients who underwent cold-cutting techniques demonstrated significantly greater improvements in sexual function than those treated with electrocautery (ΔFSFI: 15.8±4.2 vs. 12.7±3.5, $p<0.001$). However, changes in genital self-image were comparable between the two energy modalities (ΔFGSIS: 14.7±2.5 vs. 14.0±2.7, $p=0.10$). Furthermore, one-way ANOVA demonstrated that suture caliber was significantly associated with postoperative improvements in both FGSIS ($p=0.02$) and FSFI ($p=0.001$), with thinner suture materials being associated with greater score improvements.

To identify independent predictors of postoperative improvement, a forward stepwise linear regression analysis was performed including mode of delivery, suture size, energy modality (cold cutting vs. electrocautery), concomitant

hoodoplasty, labia majoraplasty, and labia minora surgical technique. For ΔFSFI total score, the use of thinner suture material (β=0.27, p=0.01) and cold-cutting technique (β=0.22, p=0.04) emerged as independent predictors of greater postoperative improvement. In contrast, for ΔFGSIS, thinner suture material was the only independent predictor of greater improvement (β=0.24, p=0.01).

At baseline, all patients had total FSFI scores below the validated cutoff value of 27.2, indicating female sexual dysfunction. Postoperatively, a substantial improvement was observed, with only 14 patients (29.7%) in the wedge group and 17 patients (36.1%) in the Linear group remaining below this threshold. Consequently, 33 patients (70.3%) in the wedge group and 30 patients (63.9%) in the linear group achieved FSFI scores consistent with normal sexual function following surgery.

Similarly, preoperative genital self-image was generally poor in both groups. In each group, 45 patients (95.7%) had FGSIS scores between 7 and 14 points, while the remaining two patients (4.3%) had scores between 15 and 21 points. Following surgery, a marked shift toward higher FGSIS categories was observed. No patients remained within the lower score ranges, and all patients (100%) achieved FGSIS scores between 22 and 28 points, indicating a substantial improvement in genital self-image.

DISCUSSION

In recent years, increasing aesthetic awareness and heightened functional expectations regarding female genital appearance have led to a marked rise in the demand for female genital cosmetic procedures, with labiaplasty emerging as one of the most frequently performed operations worldwide. National databank statistics demonstrate a continuous growth in labiaplasty rates, underscoring its evolving role within modern aesthetic and reconstructive gynecology.[13]

Parallel to this growing demand, contemporary surgical practice has diversified substantially, with the development of multiple operative techniques aimed at addressing patient-specific anatomical characteristics, functional complaints, and aesthetic goals. Consequently, the selection of an appropriate surgical approach should not be regarded merely as a technical preference but rather as a multidimensional clinical decision-making process. Comprehensive preoperative evaluation, including anatomical variations, symptom severity, functional expectations, cosmetic concerns, safety considerations, and anticipated complication risks, is essential for optimizing both surgical success and patient satisfaction. Despite ongoing refinements in technique, no single procedure has yet demonstrated universal superiority across all patient populations. Therefore, current evidence supports an individualized, patient-centered strategy rather than a standardized approach.[6,14]

In the present study, both wedge and linear (trim) labiaplasty techniques resulted in significant improvements in genital self-image and sexual function. Substantial postoperative increases in total FGSIS and FSFI scores were observed in both subgroups, highlighting the positive psychosexual and quality-of-life benefits associated with labiaplasty, irrespective of the surgical method employed.

The wedge resection technique remains one of the most widely used approaches in clinical practice and has been consistently associated with favorable aesthetic outcomes. Its principal advantage lies in the precise control of excision depth and margins, allowing individualized tissue reduction while preserving the natural labial edge, pigmentation gradients, and contour. By maintaining anatomical continuity, this technique has been reported to result in a more physiologic postoperative appearance and less conspicuous scarring.[15] Consistent with these theoretical benefits, patients undergoing wedge resection in our cohort demonstrated marked postoperative improvements in both FGSIS and FSFI scores.

However, wedge resection is not without limitations. Previous studies have reported an increased risk of wound dehiscence, likely attributable to wider excision areas and elevated tension along newly created suture lines.[15] Similarly, in our series, wound dehiscence represented the most frequent complication in the wedge group, occasionally necessitating revision surgery. To mitigate these risks, modified wedge techniques that preserve central neurovascular structures have been introduced, with reports of reduced dehiscence rates and improved healing profiles. Such refinements suggest that careful preservation of vascular supply may play a critical role in minimizing postoperative complications.[16]

Conversely, the linear (trim) technique is frequently preferred due to its technical simplicity, short learning curve, and shorter operative time. By employing a straightforward longitudinal excision of redundant tissue, this method offers a predictable and efficient surgical workflow.[17] In accordance with these characteristics, operative times were significantly shorter in the linear resection group in our study. Nevertheless, because this approach involves direct removal of the native labial edge, it may compromise natural morphology and pigmentation, potentially resulting in less physiologic aesthetic outcomes. Postoperative dissatisfaction related to cosmetic appearance was the most commonly reported concern among patients undergoing linear resection in our cohort. In addition, scar contracture along the incision line represented a recurrent issue, occasionally contributing to local tightness or contour irregularities. Thus, although technically straightforward and reliable, the trim technique may present aesthetic trade-offs in selected patients.[18]

Study Limitations

This study has several limitations that should be acknowledged. Its single-center design and relatively limited sample size may restrict the generalizability of the findings. In addition, the six-month follow-up period may not fully capture long-term aesthetic and functional outcomes. As patients were allocated according to anatomical suitability and surgeon preference, some baseline differences between groups emerged (Table 1) and a degree of selection bias cannot be excluded. In particular, significant baseline differences in age and preoperative FSFI scores were present between the groups. Since adjusted analyses were not performed to

account for these imbalances, residual confounding may have influenced the comparative results and should be considered when interpreting the findings. Nevertheless, the prospective collection of data, the use of standardized surgical protocols performed by experienced genital aesthetic surgeons, and the assessment of outcomes using validated instruments strengthen the reliability of the present findings.

Taken together, both techniques provided significant functional and psychosexual benefits, yet each demonstrated distinct complication profiles and aesthetic considerations.[19] Furthermore, multivariable regression analysis demonstrated that technical aspects of the procedure, particularly the use of thinner suture material and cold-cutting rather than electrocautery, were the strongest independent predictors of greater postoperative improvement in sexual function. In contrast, thinner suture material was the only independent predictor of greater improvement in genital self-image. Importantly, no significant differences were observed between groups in postoperative FGSIS or FSFI total scores, suggesting that improvements in genital self-image and sexual function are influenced more by appropriate patient selection and individualized surgical planning than by the specific surgical technique itself.

CONCLUSION

Neither wedge nor linear labiaplasty can be considered universally superior in this cohort. Instead, optimal outcomes appeared to depend on tailoring the surgical approach to each patient's anatomy, expectations, and risk profile. An individualized, patient-centered strategy remains fundamental for maximizing both safety and aesthetic success. Future large-scale, prospective, and multicenter studies are warranted to further clarify technique-specific indications and to establish evidence-based guidelines for patient-specific surgical selection.

Ethics

Ethics Committee Approval: The study was approved by the İstanbul Medipol University Non-Interventional Clinical Research Ethics Committee (approval number: 1131, date: 11.09.2025).

Informed Consent: Written informed consent was obtained from all participants prior to enrollment.

Footnotes

Authorship Contributions

Surgical and Medical Practices: Y.C., B.Y., Concept: Y.C., E.Y., Design: Y.C., E.Y., Data Collection or Processing: Y.C., B.Y., Analysis or Interpretation: Ö.Y.A., E.Y., Literature Search: Ö.Y.A., B.Y., Writing: Y.C., Ö.Y.A.

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