

· 临床研究 ·

髌股关节置换术治疗单纯髌股关节炎的疗效研究

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【摘要】 目的: 探讨髌股关节置换术治疗单纯髌股关节炎的临床疗效。方法: 2013 年 7 月至 2017 年 6 月行髌股关节置换术患者 35 例 42 膝, 女 34 例, 男 1 例; 年龄 45~70(55.0±8.2) 岁; 病程 6~36(13.7±2.5) 个月。术前及末次随访时对患者进行牛津膝关节评分, 末次随访时对患者进行手术满意度评估, 另摄膝关节正侧位 X 线片及髌骨轴位片, 评估有无假体松动, 记录患者术后出现的血肿、关节感染等并发症。结果: 35 例患者 42 膝随访时间 18~65(35.0±7.2) 个月, 手术时间(56.2±8.7) min。牛津膝关节评分由术前(28.14±0.36)分提高至术后末次随访(37.19±0.47)分, 差异有统计学意义($P<0.05$), 其中疼痛项目评分由术前(10.12±0.26)分提高至术后末次随访(15.83±0.30)分, 功能项目评分由术前(18.02±0.13)分提高至术后末次随访(21.36±0.23)分, 差异均有统计学意义($P<0.05$)。有 1 例患者双膝术后早期出现伤口线结反应, 经清创后好转; 另 1 例术后 5 周出现伤口周围红肿, 经抗生素治疗后好转; 1 例术后 1 个月出现股四头肌缝合处撕裂, 经重新缝合后好转; 未发现假体松动者。结论: 第 2 代假体髌股关节置换术治疗单纯严重髌股关节炎早期临床疗效满意, 并发症少, 但应严格把握手术指征, 严重病例可选用膝关节 CT 扫描定制髌股关节假体, 减少术后并发症, 提高临床疗效。

【关键词】 髌股关节; 骨关节炎, 膝; 关节成形术, 置换, 膝

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Patellofemoral arthroplasty for the treatment of patellofemoral arthritis GAO Hua-li, XIAO Lian-bo*, ZHANG Qian, ZHANG Jie-chao, HE Yong, ZHAI Wei-tao, and SHI Qi. *Department of Orthopaedics Surgery, Guanghua Hospital Affiliated to Shanghai University of Traditional Chinese Medicine, Shanghai 200052, China

ABSTRACT Objective: To explore the clinical effect of patellofemoral joint replacement in the treatment of patellofemoral arthritis. **Methods:** From July 2013 to June 2017, 35 patients with 42 knees underwent patellofemoral arthroplasty, including 34 females and 1 male, aged 45 to 70 (55.0±8.2) years old, with a course of 6 to 36 (13.7±2.5) months. Before and at the end of the follow-up, the patients were assessed with Oxford knee score, satisfaction with the operation was assessed at the end of the follow-up. In addition, X-ray films of the front and side of the knee joint and axial films of the patella were taken to assess whether the prosthesis was loose, and complications such as hematoma and joint infection were recorded. **Results:** Forty-two knees of 35 patients were followed up for 18 to 65 (35.0±7.2) months, and the operation time was (56.2±8.7) min. Oxford knee joint score increased from preoperative 28.14±0.36 to 37.19±0.47 at the end of the follow-up ($P<0.05$). The score of pain items increased from preoperative 10.12±0.26 to 15.83±0.30 at the end of the follow-up, and the score of functional items increased from preoperative 18.02±0.13 to 21.36±0.23 at the end of the follow-up ($P<0.05$), there was statistical significance ($P<0.05$). In one case, there was wound suture reaction in the early postoperative period, which was improved after debridement; in the other case, there was swelling around the wound 5 weeks after operation, which was improved after antibiotic treatment; in one case, there was tear at the suture of quadriceps femoris muscle at 1 month after operation, which was improved after re suture; no loosening of prosthesis was found. **Conclusion:** The second generation of patellofemoral arthroplasty for the treatment of simple severe patellofemoral arthritis has satisfactory early clinical effect and few complications, but the indication of operation should be strictly grasped. For severe cases, CT scan of knee joint can be used to customize the patellofemoral prosthesis, so as to reduce postoperative complications and improve the clinical effect.

KEYWORDS Patellofemoral joint; Osteoarthritis, knee; Arthroplasty, replacement, knee

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单纯性髌股关节炎(patellofemoral osteoarthritis, PFOA)临床上发病率高, 病因复杂, 治疗上较棘手, 有报道称 PFOA 在有症状性膝骨关节炎患者中发生率约为 20%^[1], 内侧 PFOA 在女性和男性中的发病率分别为 0.3% 和 0.7%, 外侧 PFOA 在女性和男性中

发病率分别为 1.6% 和 3.7%^[2]。早期 PFOA 的治疗主要以消炎止痛药物、关节腔注射玻璃酸钠或激素、理疗及功能锻炼为主,对于后期髌股关节退变严重的患者治疗方式可能就面临着行髌股关节置换术(patellofemoral arthroplasty, PFA)或全膝关节表面置换术(total knee arthroplasty, TKA),为进一步明确髌股关节置换术在严重髌股关节炎中的疗效,最近我们对从 2013 年 7 月至 2017 年 6 月进行的 PFA 手术进行了回顾性分析,报告如下。

1 资料与方法

1.1 病例选择

诊断标准:参照中华医学会骨科学分会《骨关节炎诊治指南(2007 年版)》膝关节炎诊断标准^[3]制定:(1)反复膝痛 1 个月以上,上下楼梯前疼痛明显,下蹲困难或蹲下后站起困难。(2)髌周压痛明显,髌骨研磨试验阳性。(3)髌股关节轴位 X 线片示髌股关节退变,关节周缘骨赘增生,关节间隙减小或消失。纳入标准:(1)髌前疼痛,上下楼梯及坐位站起时疼痛加重,经保守治疗无效。(2)X 线片显示髌股关节明显退变征象,如关节间隙狭窄,增生,软骨下骨硬化、囊性变等。(3)MRI 提示炎症及磨损发生在髌股关节,未累及胫股关节。排除标准:(1)有明显膝关节内翻或外翻畸形。(2)术前检查提示患肢局部或全身他处存在感染病灶。(3)膝关节站立位片显示胫股关节间隙狭窄。(4)患者一般情况差,不能耐受手术。

1.2 一般资料

2013 年 7 月至 2017 年 6 月在我科行 PFOA 的患者 35 例 42 膝,均为髌股关节骨关节炎改良 Iwano 等^[4]分期 II-III 期患者,其中女 34 例,男 1 例,年龄 45~70(55.0±8.2)岁,病程 6~36(13.7±2.5)个月,所有入组患者符合病例选择标准。

1.3 治疗方法

1.3.1 手术方法 所有手术采用统一手术入路及技术,假体均为第 2 代髌股关节 Onlay 假体(Zimmer Gender Solutions PFJ System),麻醉成功后,从髌前正中切口切开,分离皮下,内侧髌旁入路进入,保护半月板及髌下脂肪垫,外翻髌骨暴露股骨滑车,股骨滑车最低处标记 A/P 轴,通过两侧股骨髁标记 A/P 轴的垂线,以此作为设定外旋的参照,以 6 mm 髓内钻于后交叉韧带起点前约 8 mm 处钻孔,安装髓内前切口导向器直至其近端表面轻轻接触股骨远端为止,旋转导向器使导向器上的垂直参考线与 A/P 轴平行,设定前切口的外旋和深度,以切除导向器确定前切口后固定导向器并以摆锯做前切口,选择尺寸和侧面适当的磨铣导向器并仔细定位后初步确定股骨滑车尺寸,确保前缘能够覆盖前切口但不会凸出,

植入物没有凸出到股骨髁间切迹中;固定磨铣导向器按磨具轨道打磨出股骨滑车中央、内侧及外侧轨道,钻锚固栓及尾孔,安装滑车试模;选择合适大小髌骨磨具对髌骨进行打磨,安装髌骨试模,检查髌骨活动轨迹(必要时行外侧支持带松解),确定髌骨轨迹及假体覆盖范围良好后正式植入股骨滑车及髌骨假体,并以骨水泥固定,清除多余骨水泥,待骨水泥凝固后再次确认髌骨活动轨迹良好,碘伏浸泡及生理盐水冲洗伤口,逐层缝合切口。

1.3.2 术后处理 术后所有患者采用统一的股四头肌训练康复方案,利伐沙班片预防血栓 2 周。

1.4 观察项目与方法

对患者进行主观满意度调查,分为非常满意、基本满意、不满意。末次随访时摄膝关节正侧位片及髌骨轴位片评估有无假体松动(见图 1);记录术后产生的血肿、关节感染等并发症。采用牛津膝关节评分(Oxford knee score)^[5],由 12 个构成项目组成,涉及疼痛程度、活动能力、跛行、下楼梯、坐下后站立、下蹲、打软腿、睡眠、个人卫生、家务、购物和上下交通工具等,其中 5 项关于疼痛,7 项关于功能,每个项目评分为 0~4 分,0 分为最剧烈反应,4 分为最低限度反应,最大分值 48 分,分数越高代表功能恢复越好。

1.5 统计学处理

采用 SPSS 24.0 软件对数据进行统计学分析,定量资料以均数标准差($\bar{x} \pm s$)表示,对术前及末次随访 Oxford 膝关节评分进行比较,检验方法为配对设计 t 检验,检验水准 α 为 0.05。以 $P < 0.05$ 为差异有统计学意义。

2 结果

本组 35 例患者平均手术时间(56.2±8.7) min,随访时间 18~65(35.0±7.2)个月。末次随访时,35 例患者中有 18 例表示对手术效果非常满意,12 例患者表示基本满意,有 5 例患者表示不满意,认为手术改善不明显或不如术前。35 例患者中有 1 例双膝 PFA 术后早期出现双膝伤口线结反应,予小清创后好转;有 1 例术后 5 周出现关节红肿,未培养出细菌,抗生素使用后好转;1 例患者术后 1 个月出现膝关节血肿,行手术清创时发现髌上股四头肌连续缝合部位撕裂导致,于重新缝合后好转;末次随访未发现有假体松动患者。

35 例患者 42 膝关节牛津评分结果见表 1,总分由术前(28.14±0.36)分提高至术后末次随访(37.19±0.47)分,差异有统计学意义($P < 0.05$),其中疼痛项目评分由术前(10.12±0.26)分提高至术后末次随访(15.83±0.30)分,功能项目评分由术前(18.02±0.13)分提高至术后末次随访(21.36±0.23)分,差异均有统计

表 1 髌股关节炎行髌股关节置换术患者 35 例 (42 膝) 手术前后牛津评分结果 ($\bar{x} \pm s$, 分)

Tab.1 Oxford score before and after patellofemoral arthroplasty in 42 knees of 35 patients with patellofemoral arthritis ($\bar{x} \pm s$, score)

时间	疼痛评分	功能评分	总分
术前	10.12±0.26	18.02±0.13	28.14±0.36
末次随访	15.83±0.30	21.36±0.23	37.19±0.47
t 值	13.29	13.88	14.98
P 值	<0.000 1	<0.000 1	<0.000 1

学意义 ($P < 0.05$)。典型病例见图 1。

3 讨论

3.1 髌股关节置换术手术指征

髌股关节炎主要表现为膝前痛,上下楼梯或下蹲站起时疼痛加重,平地行走时症状不明显,可伴有膝关节肿胀及僵硬,髌股关节置换属于部分置换手术,对于膝前痛症状明显,影像学显示髌股关节明显破坏或间隙明显狭窄、胫股关节间隙完好的患者,可以选择 PFA 手术;继发性 PFOA 可有多种原因引起,如股骨滑车发育不良、髌骨脱位或半脱位、创伤、

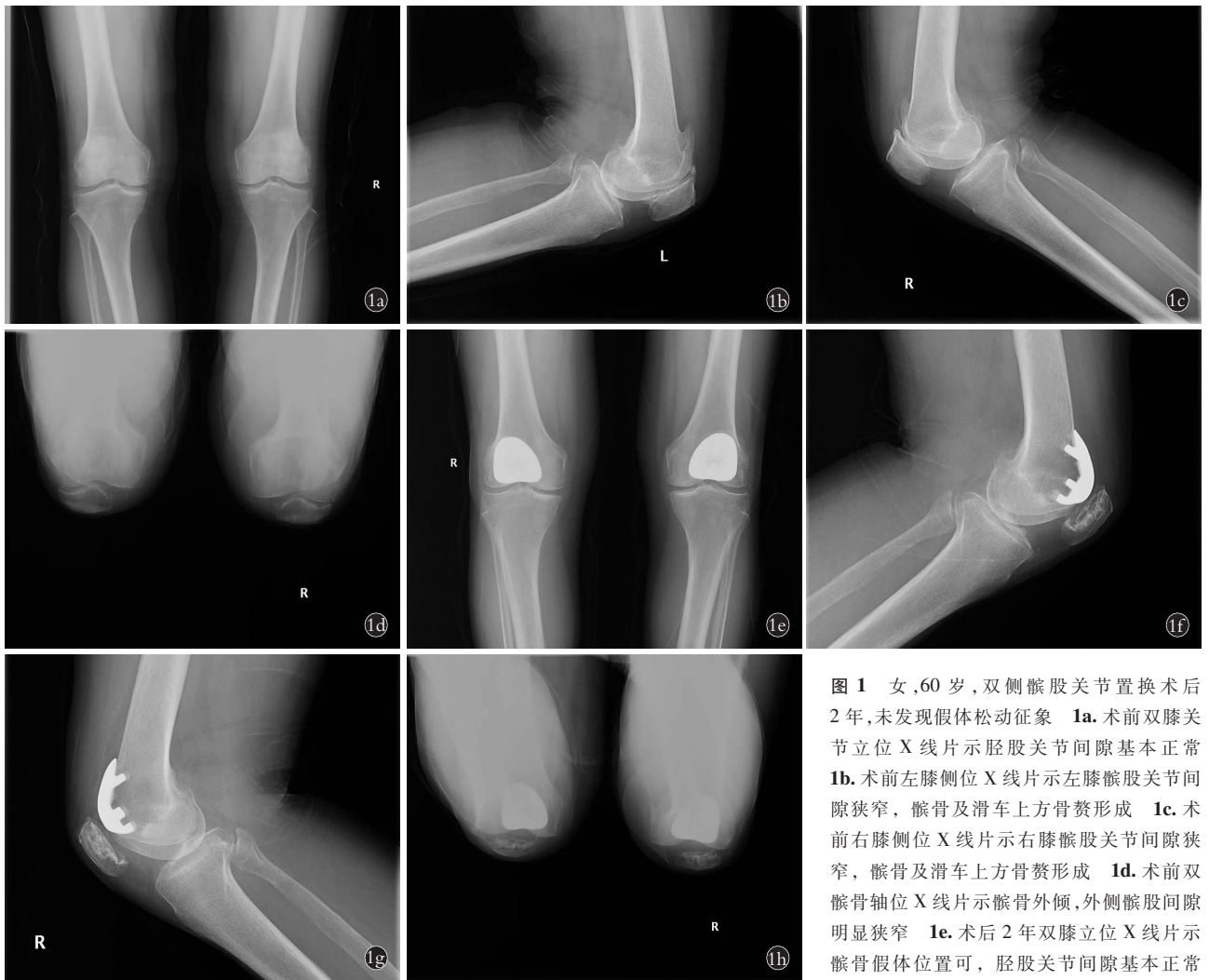


图 1 女,60 岁,双侧髌股关节置换术后 2 年,未发现假体松动征象 1a. 术前双膝关节立位 X 线片示胫股关节间隙基本正常 1b. 术前左膝侧位 X 线片示左膝髌股关节间隙狭窄,髌骨及滑车上骨赘形成 1c. 术前右膝侧位 X 线片示右膝髌股关节间隙狭窄,髌骨及滑车上骨赘形成 1d. 术前双髌骨轴位 X 线片示髌骨外倾,外侧髌股间隙明显狭窄 1e. 术后 2 年双膝立位 X 线片示髌骨假体位置可,胫股关节间隙基本正常 1f. 术后 2 年左膝侧位 X 线片示左膝髌股关节假体位置可 1g. 术后 2 年右膝侧位 X 线片示右膝髌股关节假体位置可 1h. 术后 2 年双髌骨轴位 X 线片示假体位置及髌骨轨迹可

Fig.1 A 60-year-old female patient, 2 years after bilateral patellofemoral arthroplasty, no sign of loosening of prosthesis was found 1a. X-ray film of standing position of both knee joints before operation showed the tibiofemoral joint space was basically normal 1b. X-ray film of lateral position of the left knee before operation showed the space between the patellofemoral joints of the left knee was narrow and osteophyte was formed above the patella and trochlea 1c. X-ray film of the right knee showed the space between patellofemoral joints of the right knee was narrow and osteophyte was formed above the patella and trochlea 1d. X-ray film of the axial position of the patella showed the patella was tilted outward and the lateral patellofemoral space was obviously narrow 1e. The position of the patella prosthesis was acceptable and the tibiofemoral joint space was basically normal on the two-year standing X-ray film 1f. X-ray film of lateral position of the left knee showed the position of the prosthesis of the patellofemoral joint of the left knee was good 1g. X-ray film of the right knee lateral position showed the position of the right knee patellofemoral joint prosthesis was good 1h. The position of the prosthesis and the track of the patella was good on the axial X-ray film of the patella at 2 years after the operation

骨折等,在保守治疗效果不佳时,可以选择 PFA 手术。虽然有文献^[6]称原发性 PFOA 行 PFA 手术较继发性 PFOA 更容易出现胫股关节进展性骨关节炎,但我们本次随访的患者中未发现因胫股关节明显退变需要行翻修手术的病例。

3.2 髌股关节置换术疗效分析

PFOA 临床上较常见,病因复杂,创伤、肥胖、髌骨形态异常、髌股关节不稳、髌骨异常倾斜、滑车发育不良等均与髌股关节的退变密切相关。早期髌股关节假体采用 Inlay 设计理念,单纯置换病变软骨区域,假体植入以病变区域软骨下骨为参照,并未改变原有髌股关节运动机制,因此术后并发症较多,假体生存率不高(10 年生存率 58%~90%,20 年生存率 55%~69%)^[7-8],由于 Inlay 的设计没有解决股骨髁与股骨远端解剖对应关系问题,后改进产生了第 2 代髌股关节假体;第 2 代假体采用 Onlay 设计理念,以表面置换假体替代原有髌股关节区域,充分考虑了滑车假体与股骨远端的解剖对应关系,使髌股关节运动轨迹得到明显改善^[9],这一代假体的代表有:Avon 假体、Journey PFJ 假体、Hermes 假体、Femoro Patella Vialli 假体等,虽然第 2 代假体早中期患者的满意度在 90%以上(本组满意度为 86%),假体 7~10 年生存率也高至 82%~93%^[10-11]。但从国外临床随访中也不难看出,仍然有 4%~12%的患者对手术效果不满意(本组为 14%),Mont 等^[12]报道 Avon 假体术后平均 7 年的翻修率为 12%,Hernigou 等^[13]报道假体术后 12 年翻修率为 4%,Davies^[14]更是报道 Femoro Patella Vialli 假体 2 年的翻修率为 13.5%;失败的原因有很多,可能与手术指征有关,有人研究发现胫股关节炎的进行性加重是 PFA 手术失败的重要原因^[6],也可能与手术技术的选择有关,包括术中软组织的平衡是否到位,合并髌骨不稳的患者是否要结合内侧髌股韧带重建、胫骨结节的内移抬高等,由于导致髌股关节炎的病因复杂,手术疗效不确切,甚至很多医生宁愿选择 TKA 来解决严重 PFOA 的患者,临床随访两者疗效相当^[15],但 PFOA 手术的翻修率明显高于 TKA 手术^[16],显然 TKA 对于严重 PFOA 也不失为一种好的解决方案,但总觉得有损伤过大之嫌。随着第 3 代髌股关节假体(膝关节 CT 扫描重建定制假体)的发展及临床随访优良结果(Sisto-Sarin 报道第 3 代 KineMatch 假体 11 年随访患者满意度为 100%,假体生存率为 100%^[17]),使未来严重 PFOA 的单间室治疗仍然十分可期。

参考文献

[1] Hart HF,Stefanik JJ,Wyndow N,et al. The prevalence of radiographic and MRI-defined patellofemoral osteoarthritis and struc-

tural pathology: a systematic review and meta-analysis[J]. Br J Sports Med, 2017, 51(16): 1195-1208.

[2] Cho HJ, Gn KK, Kang JY, et al. Epidemiological characteristics of patellofemoral osteoarthritis in elderly Koreans and its symptomatic contribution in knee osteoarthritis[J]. Knee, 2016, 23(1): 29-34.

[3] 中华医学会骨科学分会. 骨关节炎诊治指南(2007 年版)[J]. 中华骨科杂志, 2007, 27(10): 793-796. Chinese Society of Osteopathic Medicine. Guidelines for the diagnosis and treatment of osteoarthritis (2007 edition)[J]. Zhonghua Gu Ke Za Zhi, 2007, 27(10): 793-796.Chinese.

[4] Iwano T, Kurosawa H, Tokuyama H, et al. Roentgenographic and clinical findings of patellofemoral osteoarthritis. With special referenceto its relationship to femorotibial osteoarthritis and etiologic factors[J]. Clin Orthop Relat Res, 1990, (252): 190-197.

[5] Murray DW, Fitzpatrick R, Rogers K, et al. The use of the Oxford hip and knee scores[J]. J Bone Joint Surg Br, 2007, 89(8): 1010-1014.

[6] Argenson JN, Flecher X, Parratte S, et al. Patellofemoral arthroplasty: an update[J]. Clin Orthop Relat Res, 2005, 440: 50-53.

[7] 张中兴, 许峰, 杨小龙. 髌股关节炎的治疗进展[J]. 中国骨伤, 2018, 31(7): 684-688. ZHANG ZX, XU F, YANG XL. Progress on treatment for patellofemoral arthritis[J]. Zhongguo Gu Shang/China J Orthop Trauma, 2018, 31(7): 684-688. Chinese with abstract in English.

[8] van Jonbergen HP, Werkman DM, Barnaart LF, et al. Long-term outcomes of patellofemoral arthroplasty[J]. J Arthroplasty, 2010, 25(7): 1066-1071.

[9] Lonner JH. Patellofemoral arthroplasty: the impact of design on outcomes[J]. Orthop Clin North Am, 2008, 39(3): 347-354, vi.

[10] Sarda PK, Shetty A, Maheswaran SS. Medium term results of Avon patellofemoral joint replacement[J]. Indian J Orthop, 2011, 45(5): 439-444.

[11] Starks I, Roberts S, White SH. The Avon patellofemoral joint replacement: independent assessment of early functional outcomes [J]. J Bone Joint Surg Br, 2009, 91(12): 1579-1582.

[12] Mont MA, Johnson AJ, Naziri Q, et al. Patellofemoral arthroplasty: 7-year mean follow-up[J]. J Arthroplasty, 2012, 27(3): 358-361.

[13] Hernigou P, Caton J. Design, operative technique and ten-year results of the Hermes patellofemoral arthroplasty[J]. Int Orthop, 2014, 38(2): 437-442.

[14] Davies AP. High early revision rate with the FPV patello-femoral unicompartmental arthroplasty[J]. Knee, 2013, 20(6): 482-484.

[15] Clement ND, Howard TA, Immelman RJ, et al. Patellofemoral arthroplasty versus total knee arthroplasty for patients with patellofemoralosteoarthritis: equal function and satisfaction but higher revision rate for partial arthroplasty at a minimum eight years' follow-up[J]. Bone Joint J, 2019, 101B(1): 41-46.

[16] Woon CYL, Christ AB, Goto R, et al. Return to the operating room after patellofemoral arthroplasty versus total knee arthroplasty for isolated patellofemoral arthritis-a systematic review[J]. Int Orthop, 2019, 43(7): 1611-1620.

[17] Sisto DJ, Sarin VK. Custom patellofemoral arthroplasty of the knee [J]. J Bone Joint Surg Am, 2006, 88(7): 1475-1480.

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