

[DOI]10.12016/j.issn.2096-1456.2022.01.010

· 防治实践 ·

传统隧道技术与改良隧道技术治疗上前牙牙龈退缩临床疗效

廖阳阳, 谢成婕

南方医科大学口腔医院海珠广场院区牙周病科, 广东 广州(510280)

【摘要】 目的 比较传统隧道技术(tunnel technique, TUN)与经前庭沟切口的骨膜下改良隧道技术(vestibular incision subperiosteal tunnel access, VISTA)联合上皮结缔组织瓣(connective tissue graft, CTG)移植进行根面覆盖治疗上前牙牙龈退缩的临床效果,为临床上治疗牙龈退缩提供参考。方法 对1例13-14, 22-23 Miller I类牙龈退缩患者采用自身左右对照的方法, 22、23行TUN联合CTG移植, 13、14行VISTA联合CTG移植治疗牙龈退缩。术后进行测量牙龈退缩高度(gingival recession height, GRH)、牙龈退缩宽度(gingival recession width, GRW)、角化龈宽度(keratinized gingival width, KW), 且进行根面覆盖美学评分(root coverage esthetic score, RES)与视觉模拟评分(visual analogue scale, VAS)。结果 术后13、14、22、23取得完全的根面覆盖效果, 两种术式的术后效果均稳定, GRH、GRW降低, KW增加; 根面RES评分均为10分; 术后VISTA+CTG患者VAS为6, 较TUN+CTG的VAS高。结论 TUN+CTG和VISTA+CTG术式均可以有效地治疗牙龈退缩, 美学效果较好, 患者满意, VISTA增加附加切口使临床操作更为简便, 但舒适感较差。

【关键词】 隧道技术; 经前庭沟切口的骨膜下隧道技术; 牙龈退缩; 根面覆盖; 结缔组织移植; 根面覆盖美学评分; 牙龈退缩高度; 牙龈退缩宽度; 角化龈宽度

【中图分类号】 R78 **【文献标志码】** A **【文章编号】** 2096-1456(2022)01-0057-06

【引用著录格式】 廖阳阳, 谢成婕. 传统隧道技术与改良隧道技术治疗上前牙牙龈退缩临床疗效[J]. 口腔疾病防治, 2022, 30(1): 57-62. doi:10.12016/j.issn.2096-1456.2022.01.010.

Traditional and modified tunnel technique for the treatment of maxillary anterior teeth gingival recession

LIAO Yangyang, XIE Chengjie. Department of Periodontology, Haizhu Square District, Stomatological Hospital, Southern Medical University, Guangzhou 510280, China

Corresponding author: XIE Chengjie, Email: ChengjieXie2021@163.com, Tel: 86-20-83513847

【Abstract】 Objective To compare the clinical effect of the tunnel technique (TUN) and vestibular incision subperiosteal tunnel access (VISTA) combining connective tissue grafts (CTGs) on recovering the exposed root surface in a case of gingival recession over the upper anterior teeth and then to provide clinical evidence for gingival recession treatment.

Methods A case of gingival recession (Miller I type) over teeth 13-14 and 22-23 was treated using different techniques bilaterally. 22-23 were treated by a TUN combined CTG transplantation, while teeth 13-14 were treated by a VISTA technique combined with CTG transplantation. The gingival retraction height (GRH), gingival retraction width (GRW), keratinized gingival width (KW), root coverage aesthetic score (RES) and visual analog scale (VAS) were measured after operation. **Results** The effect of post-operation were ideal and complete gingival recovering were achieved, the postoperative effects of the two methods were stable, GRH and GRW decreased, and KW increased. RES was 10. The VAS score of VISTA combined with CTG transplantation was 6, which was higher than that of TUN+CTG. **Conclusion** Gingival recession can be treated by TUN+CTG or VISTA+CTG with ideal prognosis. VISTA with an additional incision facilitates the operative procedure but leads to less comfort.

【Key words】 tunnel technique; vestibular incision subperiosteal tunnel access; gingival recession; root surface

【收稿日期】 2021-04-17; **【修回日期】** 2021-06-21

【作者简介】 廖阳阳, 主治医师, 硕士, E-mail: sunnyliu_726@qq.com

【通信作者】 谢成婕, 副主任医师, 博士, E-mail: ChengjieXie2021@163.com, Tel: 86-20-83513847



微信公众号

coverage; connective tissue graft; root coverage esthetic score; gingival recession height; gingival recession width; keratinized tissue

J Prev Treat Stomatol Dis, 2022, 30(1): 57-62.

【Competing interests】 The authors declare no competing interests.

牙龈退缩(gingival recession, GR)是指龈缘向釉牙骨质界根方移位,引起牙根暴露^[1]。GR会导致牙本质过敏、根面龋、菌斑堆积等临床症状,甚至可能与角化龈不足相关^[2]。治疗牙龈退缩时,应先去除病因、控制炎症,并采取膜龈手术进行干预。膜龈手术主要包括,游离龈移植术、冠向复位瓣术、上皮下结缔组织瓣移植术(connective tissue graft, CTG)、侧向转位带蒂瓣移植术、引导组织再生术及隧道技术(tunnel access, TUN)等。近年来,越来越多学者应用微创隧道技术治疗牙龈退缩^[3]。TUN技术是指不离断龈乳头,从龈缘处潜行向根方分离龈瓣形成隧道,将结缔组织移植物穿入隧道内并固定^[4]。该切口设计可以增加血供,并减少创伤及瘢痕形成,但对操作器械和术者的水平要求更高。随后,Zadeh^[5]提出了经前庭沟切口的骨膜下隧道技术(vestibular incision subperiosteal tunnel access, VISTA),增加了前庭沟黏膜处的垂直切口。该术式具有传统TUN的优势,即保证了龈瓣的完整及血供,术中创伤少,由于不离断龈乳头操作能更好地限制术后龈瓣的动度^[6];而且,由于垂直切口的存在,使术中操作更加简便,降低了对

技术精确性的要求。

本研究通过对1例13-14,22-23 Miller I类牙龈退缩患者采用自身左右对照的方法,探讨应用隧道技术联合CTG及经前庭沟切口的骨膜下隧道技术联合CTG治疗上前牙牙龈退缩的临床效果,为牙龈退缩的治疗提供依据。

1 临床资料

1.1 患者资料

患者,女,25岁,以“上前牙牙龈退缩6个月余,影响美观”为主诉就诊。既往横刷牙史。口腔检查:口腔卫生状况欠佳,可见少量龈上牙石及软垢,13-14、22-23未见邻面附着丧失(图1a),13牙龈退缩4 mm,14牙龈退缩2 mm(图1b),22、23牙龈退缩约2~3 mm,牙齿无松动;牙龈生物型为薄龈型。影像学检查:上颌前牙区牙槽骨未见明显吸收。诊断:13-14、22-23牙龈退缩(Miller I类)。治疗计划:①口腔卫生宣教;②龈上洁治及龈下刮治术;③22-23隧道技术联合CTG移植;13-14经前庭沟切口的骨膜下隧道技术联合CTG移植。



a: 13, 14 tooth gingival recession; b: 22, 23 tooth gingival recession

Figure 1 Preoperative intraoral photographs of patients with 13-14, 22-23 gingival recession (Miller type I)

图1 13-14、22-23牙龈退缩(Miller I类)患者术前口内照片

1.2 治疗过程

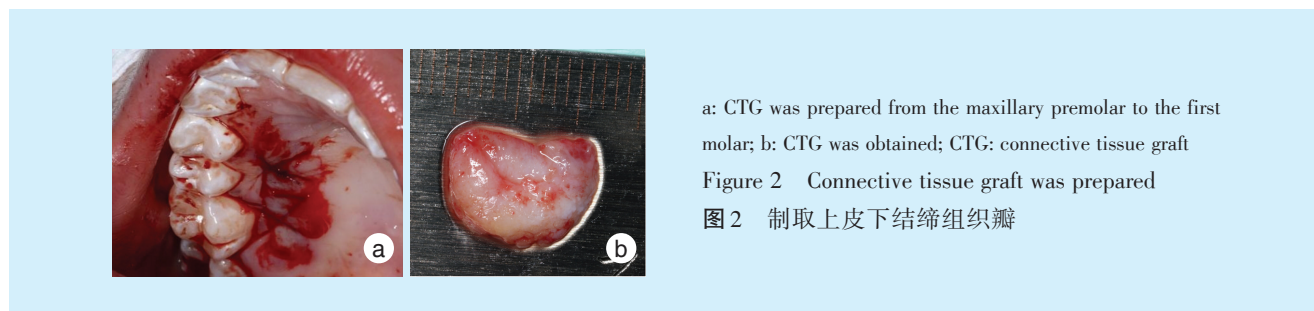
应用Hu-friedly UNC15探针记录患者牙周指标,包括牙龈退缩类型、牙龈退缩高度(gingival recession height, GRH)、牙龈退缩宽度(gingival recession width, GRW)、角化龈宽度(keratinized gingival width, KW)、牙龈生物型。术前签署南方医科大学

口腔医院牙周手术知情同意书。

1.2.1 CTG制取 根据牙龈退缩牙位,牙周探针测量所需CTG的大小,于双侧上颌第一前磨牙近中至第二磨牙近中腭侧的牙龈组织处,距龈缘约2~3 mm处做水平切口,该处切至骨膜,然后平行于骨面锐性分离半厚瓣,分别于近远中做垂直切口切

取上皮下结缔组织,厚度约 1.5 mm,修剪龈瓣外形使其利于受区覆盖;腭侧牙龈水平切口用 4-0 缝线

交叉加压缝合止血。见图 2。



a: CTG was prepared from the maxillary premolar to the first molar; b: CTG was obtained; CTG: connective tissue graft
Figure 2 Connective tissue graft was prepared
图 2 制取上皮下结缔组织瓣

1.2.2 TUN 技术 常规消毒、铺巾,21-23 盐酸阿替卡因/肾上腺素注射液行局部浸润麻醉。21-23 唇侧牙龈用 Hu-fridy 龈沟刀行沟内切口至牙槽嵴顶,改良 Orban 手术刀锐性分离,松解囊袋,隧道刀继而锐性分离至膜龈联合,形成结缔组织瓣所需空

间,并使受区牙槽骨床保持稳定。制备 CTG(具体步骤见 1.2.1),用 5-0 丝线牵引 CTG 进入隧道,用 6-0 丝线采用悬吊缝合固定 CTG,并使龈瓣冠向复位,用流动树脂将缝线粘接固定于患牙唇面协助固位。见图 3。

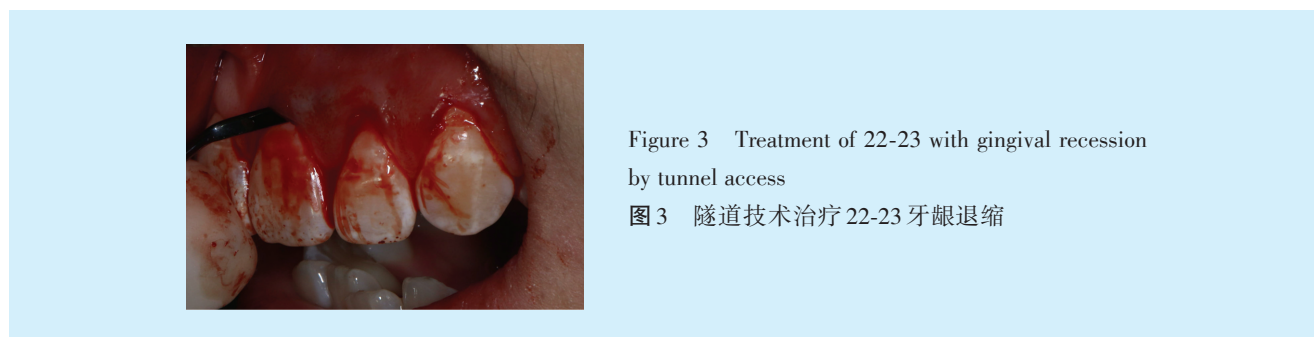
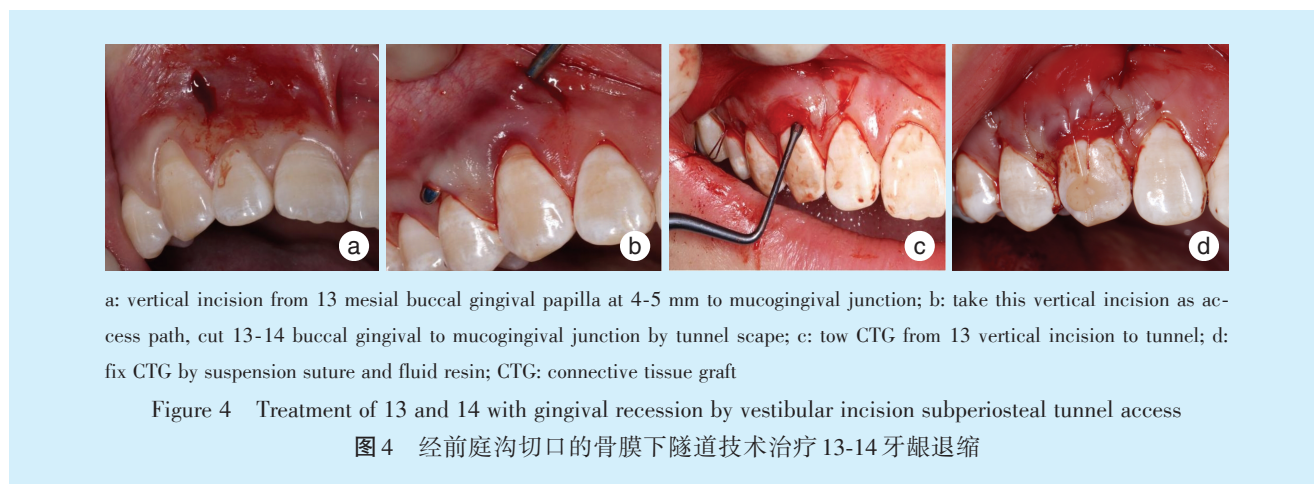


Figure 3 Treatment of 22-23 with gingival recession by tunnel access
图 3 隧道技术治疗 22-23 牙龈退缩

1.2.3 VISTA 技术 常规消毒、铺巾,12-14 盐酸阿替卡因/肾上腺素注射液行局部浸润麻醉。自 13 近中唇侧龈乳头根方 4 mm 处起向膜龈联合根方做垂直切口,以该切口为入路,用隧道刀将 12-14 唇侧牙龈与骨面分离至膜龈联合,形成隧道,并用探针检查 13-14 间的隧道是否连续贯通,使龈瓣能

充分松弛并无张力复位至釉牙骨质界。用 5-0 丝线将制取的 CTG 从 13 颊侧黏膜垂直切口处牵引至隧道内,将根面覆盖。用 6-0 丝线采用悬吊缝合固定 CTG,并使龈瓣冠向复位,用流动树脂将缝线粘接固定于患牙唇面协助固位。见图 4。



a: vertical incision from 13 mesial buccal gingival papilla at 4-5 mm to mucogingival junction; b: take this vertical incision as access path, cut 13-14 buccal gingival to mucogingival junction by tunnel scalpel; c: tow CTG from 13 vertical incision to tunnel; d: fix CTG by suspension suture and fluid resin; CTG: connective tissue graft

Figure 4 Treatment of 13 and 14 with gingival recession by vestibular incision subperiosteal tunnel access

图 4 经前庭沟切口的骨膜下隧道技术治疗 13-14 牙龈退缩

术后嘱患者术区严格制动,使用抗生素5 d,用0.12%氯己定漱液含漱;术后2周内勿刷牙,温软进食,2周后拆线并磨除树脂固定物,术后3、6个月后复诊。

1.3 评价标准

术后当天记录患者疼痛程度,用视觉模拟评分法(visual analogue scale, VAS)进行评分,0分为无痛,10分为剧烈疼痛^[7]。术后6个月随访利用根面覆盖美学评分(root coverage esthetic score, RES)系统对美学效果进行评价。RES包括牙龈边缘(gingival margin, GM)水平,龈缘轮廓外形(marginal tissue contour, MTC),软组织质地(soft tissue texture, STT),膜龈联合位置(mucogingival junction alignment, MGJ)和牙龈颜色(gingival color, GC)^[8,9]。GM水平与术前一致计0分,达到部分根

面覆盖计3分,达到完全根面覆盖计6分;MTC为不规则GM外形计0分,正常GM轮廓外形计1分;STT表现为瘢痕愈合计0分,黏膜处无瘢痕计1分;MGJ位置与邻牙不一致计0分,与邻牙一致计1分;GC与邻牙不一致计0分,与邻牙一致计1分。RES系统满分为10分^[10,11]。

2 结果

术后3个月,13、14、22、23均可取得100%的根面覆盖;腭部供区愈合良好;术后6个月,根面覆盖效果稳定,见图5。TUN术后VAS值为3, VISTA术后VAS值为6;术后3、6个月复诊行临床检查,各项临床指标见表1;术后6个月的RES评分见表2, TUN及VISTA均能为10分,美学效果好,患者满意。



表1 术前与术后3、6个月时各项临床指标的比较

Table 1 Comparative periodontal indicators between pre and postoperative after 3 and 6 months

Clinical indicators	Surgical method	Teeth	Pre-operative	Postoperative after 3 months	Postoperative after 6 months
GRH/mm	TUN	22	3	0	0
		23	2	0	0
	VISTA	13	4	0	0
		14	2	0	0
GRW/mm	TUN	22	3	0	0
		23	3	0	0
	VISTA	13	3	0	0
		14	2	0	0
KW/mm	TUN	22	1	2	2
		23	1	2	2
	VISTA	13	1	2	2
		14	1	2	2

TUN: tunnel access; VISTA: vestibular incision subperiosteal tunnel access; CRH: gingival recession height; GRW: gingival recession width; KW: keratinized gingival width

表2 术后6个月两种术式的RES评分比较

Table 2 Comparative RES between two surgical methods after 6 months

RES items	TUN		VISTA	
	22	23	13	14
GM	6	6	6	6
MTC	1	1	1	1
STT	1	1	1	1
MGJ	1	1	1	1
GC	1	1	1	1
Total	10	10	10	10

Root coverage esthetic score(RES) included gingival margin (GM) level, marginal tissue contour (MTC), soft tissue texture (STT), gingival junction alignment (MGJ) and gingival color (GC); TUN: tunnel access; VISTA: vestibular incision subperiosteal tunnel access

3 讨论

牙龈退缩发生率较高,研究显示,30岁以上人群中,约91.63%至少有1颗牙存在超过1 mm的牙

龈退缩,约39.26%牙龈退缩超过3 mm^[12]。中年人群中牙龈退缩发生率高达100%^[13-14],且与年龄成正相关^[15]。造成牙龈退缩病因较多,细菌、刷牙创伤、解剖学因素及医源性因素等都会导致退缩的发生。牙龈退缩通常非单一病因引起,而是在多种危险因素的共同作用下出现的病理改变。本病例患者有横刷牙习惯,牙龈生物型为薄龈型,可认为是机械性刺激为主导致牙龈退缩。研究显示,牙龈退缩与刷牙的持续时间和频率、技术、刷牙的力度和牙刷材质相关^[16]。本病例中,由于长时间不良刺激,机体固有功能发生改变,最终导致牙龈退缩^[17]。因此,尽早发现并去除危险因素,控制牙周炎症,配合膜龈手术治疗,才能够有效地治疗并预防牙龈退缩。

与传统软组织移植瓣技术相比,TUN技术采用更锐利、更精细的微创手术器械和缝合器械,大大减少了术中的组织损伤,牙龈乳头处不离断的切口设计可以保证龈瓣的血供及完整性,并减少瘢痕形成^[18]。Gobbato等^[19]研究显示,TUN技术结合CTG治疗牙龈退缩在术后12个月平均根面覆盖率达87%。Nart等^[20]认为CTG+TUN是治疗下前牙Miller II型及III型牙龈退缩的理想方法,20个月的随访研究显示覆盖率达83.25%。研究显示,针对Miller I型或II型的牙龈退缩,对比冠向复位瓣(coronally advanced flap, CAF)技术,TUN具有较高的RES评分及患者满意度^[21]。系统性综述显示,TUN被认为是治疗单个或多个牙齿牙龈退缩较有效的方法^[22]。本研究病例均为Miller I型牙龈退缩,对比隧道技术及VISTA技术结合CTG治疗牙龈退缩的治疗效果,结果显示两种技术均能达到完全的根面覆盖,且长期效果稳定,患者满意。范可昂等^[4]利用VISTA技术联合CTG治疗单颗牙Miller I、II度牙龈退缩,术后6个月角化龈宽度显著增加及达到完全的根面覆盖,并认为可作为临床上治疗单牙Miller I、II度牙龈退缩的方法之一。应绚等^[9]研究显示,改良TUN技术能够有效改善牙龈退缩问题,且较浅非龋性牙颈部缺损(non-carious cervical lesion, NCCL ≤ 1 mm)的存在不会影响手术疗效。既往研究均显示,TUN技术对于牙龈退缩具有较好临床美观效果及应用前景。

然而,由于VISTA技术增加了附加切口,患者术后的VAS值为6,对比TUN技术(VAS值为3)有所增加,即术后疼痛感较强烈,而且对于上前牙的

附加切口,术后易有瘢痕,影响美观。在本病例中,VISTA技术应用于13、14的牙龈退缩,退缩位点较少,操作感较好,但牙龈退缩的位点大于3个牙位时,垂直切口的入路有限,可能会影响手术操作,必要时可增加多个垂直切口利于临床操作。针对于垂直切口的位置,一般均建议在退缩深度较大的牙位近中处,本病例位于13近中,可增加隧道瓣的活动度,使操作更加简便,临床效果好。此外,针对单牙Miller I类或轻度Miller II类牙龈退缩,CAF联合CTG的双层技术仍然被认为是治疗牙龈退缩的金标准,可获得高度可预见的临床结果^[23]。因此,术前应做好详细评估,根据具体情况,选择适宜的术式,以达到更便利的临床操作与更佳的美观效果。

综上所述,TUN+CTG和VISTA+CTG术式均可以有效地治疗牙龈退缩,显著改善牙龈退缩高度和宽度,增加角化龈宽度,术后的美学效果好,患者满意。两种治疗方法各有优势,需根据具体情况灵活应用。

[Author contributions] Liao YY collected case material and wrote the article. Xie CJ reviewed the article. All authors read and approved the final manuscript as submitted.

参考文献

- [1] Santamaria MP, Queiroz LA, Mathias IF, et al. Resin composite plus connective tissue graft to treat single maxillary gingival recession associated with non-carious cervical lesion: randomized clinical trial[J]. J Clin Periodontol, 2016, 43(5): 461-468. doi: 10.1111/jcpe.12524.
- [2] Zucchelli G, Mounssif I. Periodontal plastic surgery[J]. Periodontol 2000, 2015, 68(1): 333-368. doi: 10.1111/prd.12059.
- [3] 闫福华, 李凌俊. 牙龈退缩及微创隧道治疗技术[J]. 口腔疾病防治, 2019, 27(6): 341-349. doi: 10.12016/j.issn.2096-1456.2019.06.001.
Yan FH, Li LJ. Gingival recession and minimally invasive tunnel therapy[J]. J Prev Treat Stomatol Dis, 2019, 27(6): 341-349. doi: 10.12016/j.issn.2096-1456.2019.06.001.
- [4] 范可昂, 钟金晟, 欧阳翔英, 等. 经前庭沟切口的骨膜下隧道技术在治疗Miller I、II度单牙牙龈退缩中的应用[J]. 北京大学学报(医学版), 2019, 51(1): 80-85. doi: 10.19723/j.issn.1671-167X.2019.01.015.
Fan KA, Zhong JS, Ouyang YX, et al. Application of subperiosteal tunnel technique through vestibular groove incision in the treatment of Miller grade I and II single tooth gingival recession[J]. Beijing Da Xue Xue Bao Yi Xue Ban, 2019, 51(1): 80-85. doi: 10.19723/j.issn.1671-167X.2019.01.015.
- [5] Zadeh HH. Minimally invasive treatment of maxillary anterior gingival recession defects by vestibular incision subperiosteal tunnel

- access and platelet-derived growth factor BB[J]. *Int J Periodontics Restorative Dent*, 2011, 31(6): 653-660.
- [6] Santamaria MP, Neves F, Silveira CA, et al. Connective tissue graft and tunnel or trapezoidal flap for the treatment of single maxillary gingival recessions: a randomized clinical trial[J]. *J Clin Periodontol*, 2017, 44(5): 540-547. doi: 10.1111/jcpe.12714.
- [7] Santuchi CC, Cortelli SC, Cortelli JR, et al. Pre- and post-treatment experiences of fear, anxiety, and pain among chronic periodontitis patients treated by scaling and root planing per quadrant versus one-stage full-mouth disinfection: a 6-month randomized controlled clinical trial[J]. *J Clin Periodontol*, 2015, 42(11): 1024-1031. doi: 10.1111/jcpe.12472.
- [8] Kim SM, Choi YH, Kim YG, et al. Analysis of the esthetic outcome after root coverage procedures using a comprehensive approach[J]. *J Esthet Restor Dent*, 2014, 26(2): 107-118. doi: 10.1111/jerd.12085.
- [9] 应绚, 陈悦, 张凯利. 改良隧道技术治疗牙龈退缩合并非龋性牙颈部缺损的临床研究[J]. *华西口腔医学杂志*, 2019, 37(5): 496-500. doi: 10.7518/hxkq.2019.05.008.
Ying X, Chen Y, Zhang KL. Clinical study of modified tunnel technique in the treatment of gingival recession with non carious neck defects[J]. *West Chin J Stomatol*, 2019, 37(5): 496-500. doi: 10.7518/hxkq.2019.05.008.
- [10] Cairo F, Rotundo R, Miller PD, et al. Root coverage esthetic score: a system to evaluate the esthetic outcome of the treatment of gingival recession through evaluation of clinical cases[J]. *J Periodontol*, 2009, 80(4): 705-710. doi: 10.1902/jop.2009.080565.
- [11] Cairo F, Nieri M, Cattabriga M, et al. Root coverage esthetic score after treatment of gingival recession: an interrater agreement multicenter study[J]. *J Periodontol*, 2010, 81(12): 1752 - 1758. doi: 10.1902/jop.2010.100278.
- [12] Romandini M, Soldini MC, Montero E, et al. Epidemiology of mid-buccal gingival recessions in NHANES according to the 2018 World Workshop Classification System[J]. *J Clin Periodontol*, 2020, 47(10): 1180-1190. doi: 10.1111/jcpe.13353.
- [13] Kassab MM, Cohen RE. The etiology and prevalence of gingival recession[J]. *J Am Dent Assoc*, 2003, 134(2): 220-225. doi: 10.14219/jada.archive.2003.0137.
- [14] Gorman WJ. Prevalence and etiology of gingival recession[J]. *J Periodontol*, 1967, 38(4): 316-322.
- [15] Mythri S, Arunkumar SM, Hegde S, et al. Etiology and occurrence of gingival recession - an epidemiological study[J]. *J Indian Soc Periodontol*, 2015, 19(6): 671-675. doi: 10.4103/0972-124X.156881.
- [16] Doerfer CE, Staehle HJ, Wolff D. Three-year randomized study of manual and power toothbrush effects on pre-existing gingival recession[J]. *J Clin Periodontol*, 2016, 43(6): 512-519. doi: 10.1111/jcpe.12518.
- [17] Lopez R, Smith PC, Goestemeyer GA. Ageing, dental caries and periodontal diseases[J]. *J Clin Periodontol*, 2017, 44(18, S1): S145-S152. doi: 10.1111/jcpe.12683.
- [18] Vincent-Bugnas S, Borie G, Charbit Y. Treatment of multiple maxillary adjacent class I and II gingival recessions with modified coronally advanced tunnel and a new xenogeneic acellular dermal matrix[J]. *J Esthet Restor Dent*, 2018, 30(2): 89-95. doi: 10.1111/jerd.12337.
- [19] Gobato L, Nart J, Bressan E, et al. Patient morbidity and root coverage outcomes after the application of a subepithelial connective tissue graft in combination with a coronally advanced flap or via a tunneling technique: a randomized controlled clinical trial[J]. *Clin Oral Investig*, 2016, 20(8): 2191-2202. doi: 10.1007/s00784-016-1721-7.
- [20] Nart J, Valles C. Subepithelial connective tissue graft in combination with a tunnel technique for the treatment of miller class II and III gingival recessions in mandibular incisors: clinical and esthetic results[J]. *Int J Periodontics Restorative Dent*, 2016, 36(4): 591-598. doi: 10.11607/prd.2748.
- [21] Zuhr O, Rebele SF, Schneider D, et al. Tunnel technique with connective tissue graft versus coronally advanced flap with enamel matrix derivative for root coverage: a RCT using 3D digital measuring methods. Part I. Clinical and patient-centred outcomes[J]. *J Clin Periodontol*, 2014, 41(6): 582-592. doi: 10.1111/jcpe.12178.
- [22] Tavelli L, Barootchi S, Nguyen TV, et al. Efficacy of tunnel technique in the treatment of localized and multiple gingival recessions: a systematic review and meta-analysis[J]. *J Periodontol*, 2018, 89(9): 1075-1090. doi: 10.1002/JPER.18-0066.
- [23] Sanz M, Simion M, Working Grp 3 European Workshop Pe. Surgical techniques on periodontal plastic surgery and soft tissue regeneration: consensus report of group 3 of the 10th European Workshop on Periodontology[J]. *J Clin Periodontol*, 2014, 41(Suppl 15): S92-S97. doi: 10.1111/jcpe.12215.

(编辑 周春华, 韩倩倩)



官网