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徐丽, 王敏, 刘芳, 张容秀, 王婷婷

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富血小板纤维蛋白结合冠向复位瓣在牙龈退缩中的应用

徐 丽¹, 王 敏², 刘 芳¹, 张容秀¹, 王婷婷¹

[摘要] **目的:**评价显微手术中用冠向复位瓣(coronally advanced flap, CAF)联合富血小板纤维蛋白(platelet-rich fibrin, PRF)与单纯使用冠向复位瓣在治疗牙龈退缩(GR)中的应用效果。**方法:**36例GR病人中,随机选取18例25颗GR患牙进行PRF+CAF(观察组);余18例24颗GR患牙进行CAF(对照组);2组均采用显微手术方法,记录并比较2组病人基线和术后3、6个月的牙周探诊深度(PD)、牙龈垂直向退缩高度(VGR)、角化龈宽度(KTH)、牙龈厚度(GT)、病人舒适度(PCS)、敏感度(HS)、美学指数(PES)以及病人总满意度。**结果:**2组术前、术后PD、KTH差异均无统计学意义($P > 0.05$);在根面覆盖上,2组术前、术后VGR比较差异有统计学意义($P < 0.01$);观察组术前、术后GT比较差异均有统计学意义($P < 0.01$);病人满意度(包括PCS、HS、PES)术前、术后差异均有统计学意义($P < 0.01$),特别是HS,病人术后总体比较满意。**结论:**PRF膜与CAF联合治疗GR可以达到很好的根面覆盖效果,且术后GT及病人满意度比单纯使用CAF具有更突出的优点。

[关键词] 牙龈退缩;富血小板纤维蛋白;冠向复位瓣

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Application of platelet-rich fibrin combined with coronally advance flap in the treatment of gingival recession

XU Li¹, WANG Min², LIU Fang¹, ZHANG Rong-xiu¹, WANG Ting-ting¹

(1. Department of Stomatology, The First Affiliated Hospital of Bengbu Medical College, Bengbu Anhui 233004;

2. Department of Stomatology, The Second Affiliated Hospital of Bengbu Medical College, Bengbu Anhui 233040, China)

[Abstract] **Objective:** To compare the application effects between the platelet-rich fibrin (PRF) combined with coronally advanced flap (CAF) and coronally advanced flap alone in the treatment of gingival recession (GR). **Methods:** Thirty-six patients with GR were randomly divided into the observation group (18 cases, 25 teeth with GR) and control group (18 cases, 24 teeth with GR). The observation group and control group were treated with PRF combined with CAF and CAF, respectively. The microsurgery in two groups were used. The base line, and periodontal probing depth (PD), vertical gingival regression height (VGR), keratinized gingival width (KTH), gingival thickness (GT), patient comfort (PCS), sensitivity (HS), aesthetic index (PES) and total satisfaction after 3 and 6 months of operation in two groups were recorded and compared. **Results:** The differences of the PD and KTH in two groups between before and after operation were not statistically significant ($P > 0.05$). In terms of root surface coverage, the difference of the VGR in two groups between before and after operation was statistically significant ($P < 0.01$). The difference of the GT in the observation group between before and after operation was statistically significant ($P < 0.01$). The differences of the patients' satisfaction (including the PCS, HS and PES) in the observation group were statistically significant between before and after surgery ($P < 0.01$), especially for HS, the patients were generally satisfied after surgery. **Conclusions:** The PRF membrane combined with CAF in the treatment of GR can achieve the good root surface coverage, and the postoperative GT and patient's satisfaction have more prominent advantages compared with the CAF alone.

[Key words] gingival recession; platelet-rich fibrin; coronally advanced flap

牙龈退缩(gingival recession, GR)是指牙龈冠方最顶端的边缘位于釉牙骨质界的根方,而正常的牙龈边缘应位于釉牙骨质界的冠方。可能的原因有刷牙方式不正确,牙周疾病,以及牙齿位置异常、牙槽骨开裂、咬合创伤、医源性因素等^[1-2]。发生于前牙

区域的GR会导致牙冠变长、黑三角等美学缺陷,以及牙齿敏感、根面龋坏甚至牙齿丧失等功能缺陷^[1-2],因此,大量的病人要求美学纠正来满足他们的美学需求以及功能要求。

目前根面覆盖的手术方法较多,如游离龈移植术(FGG)^[3]、冠向复位瓣(CAF)^[4]、结缔组织移植术(CTG)^[5]、引导组织再生术(GTR)^[6]和富血小板纤维蛋白(PRF)^[7]等。CAF是GR中最常用的手术方式,手术过程是将软组织冠向迁移至暴露的牙根表面,目前为止是治疗Miller I、II GR较为有效的

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[作者单位] 1. 蚌埠医学院第一附属医院 口腔科,安徽 蚌埠 233004

2. 蚌埠医学院第二附属医院 口腔科,安徽 蚌埠 233040

[作者简介] 徐 丽(1987-),女,主治医师。

手术方式,也是根面覆盖中有效的膜龈手术^[8]。PRF是第二代血小板浓缩物,是一种源于自身的白细胞和血小板聚集的纤维蛋白生物材料,是由CHOUKRON等^[9]首先提出的,PRF基质合并有血小板、白细胞、生长因子和循环干细胞,且具有特殊的3D纤维聚合网结构,这种纤维蛋白网可以使细胞更有效地迁移和增殖,保护生长因子不被蛋白水解,从而延长生长因子的释放,延长作用时间,促进组织愈合^[10-11]。本文将PRF结合CAF应用于GR中进行临床研究,现作报道。

1 资料与方法

1.1 一般资料 选取2019年6月至2020年6月到蚌埠医学院第一附属医院口腔科门诊就诊的GR病人36例,男20例,女16例,年龄23~50岁。随机抽取18例病人共25颗患牙采用PRF膜+CAF方法为观察组,余18例病人共24颗患牙采用CAF方法为对照组。

纳入标准^[12]:系统健康无疾病,病人年龄 ≥ 18 岁;位于前牙或前磨牙的Miller^[13]I、II GR,无牙槽骨缺损;有确定的釉牙骨质界;牙周探诊深度(probing depth, PD) ≤ 3 mm。排除标准:抽烟;妊娠期;过去2年进行过牙周手术;患牙牙齿松动;龋病;患牙早接触等。

1.2 手术方法

1.2.1 术前准备 所有病人接受口腔卫生宣教,并进行全口龈上洁治、龈下刮治,去除牙根部的结石和菌斑,使牙根面光滑。

1.2.2 CAF的制备 按照DE SANCTIS等^[15]的方式,术前先对术区进行消毒、铺巾,并用无菌伊红铅笔进行切割轮廓的标记,连接患牙釉牙骨质界(CEJ)至邻牙的牙龈边缘做倾斜水平切口,从切口至牙根面完全暴露处行半厚瓣,在其下方至膜龈联合处行全厚瓣,从膜龈联合至其下方行半厚瓣,直至其可以无阻力地将瓣覆盖至暴露的牙根面。翻起组织瓣,对牙面进行龈下刮治和根面平整,并对暴露牙根面用0.5%盐酸四环素溶液进行生物改性。水平切口下方的龈乳头被完全去上皮化以暴露其下方的结缔组织,所有的手术操作均在显微镜下操作。

1.2.3 PRF膜的制备 待CAF制备好后,用不含抗凝剂的试管抽取10 mL静脉血并立即离心,2 700 r/min 14 min。离心后将得到三层组织:最上层为贫血小板层,中间层为富血小板纤维蛋白层,最下层为红细胞层,用无菌镊将PRF夹出并制备成膜。

1.2.4 观察组 将PRF膜置于暴露的牙根面上,并将瓣冠向复位后缝合固定,并用牙周塞治剂保护创面。

1.2.5 对照组 直接将瓣冠向缝合固定,余与观察组相同。

1.2.6 术后医嘱 拆线前嘱病人不得自行去除牙周塞治剂,也不得对手术区域行任何清洁措施。术后服用抗生素3 d,并用0.12%氯己定漱口,10 d后拆除牙周塞治剂及缝线。

1.3 观察指标及结果判定 术后3、6个月病人创面愈合良好,并进行指标测定。(1)PD指使用牙周探针探查龈缘至袋底的深度;(2)垂直向GR高度(vertical gingival recession, VGR)指唇颊侧中央釉牙骨质界到牙龈边缘的距离;(3)角化龈宽度(keratinized tissue height, KTH)指从膜龈联合到牙龈边缘的距离;(4)牙龈厚度(gingival thickness, GT)评估颊侧中部附着牙龈的厚度,具体方法参看文献^[14]:用含有1:200 000肾上腺素的2%盐酸利多卡因进行局部浸润麻醉20 min后用带有橡胶挡片的UNC-15牙周探针在膜龈联合与游离龈沟中间一半处进行探查,最后用游标卡尺进行读数测量。(5)病人满意度:用视觉模拟量表(visual analog scale, VAS)来记录病人舒适度(patient comfort score, PCS)、病人美学指数(patient esthetic score, PES)、敏感度(hypersensitivity score, HS)以及病人的总满意度(patient satisfaction, PS)。具体方法为画一条10 cm长没有刻度的直线,线的初始端标示“失望”,线的末端标示“完全满意”,测量从初始点到病人标记的满意度之间的距离即为VAS值。并将VAS数值具体量化:其中1~3分为一般满意,4~6分为中等满意,7~10分为非常满意。总满意度为中等满意与非常满意之和除以总数的百分率。

1.4 统计学方法 采用 t 检验。

2 结果

2.1 临床观察指标 2组间术前PD、KTH、VGR、GT差异均无统计学意义($P > 0.05$);术后3个月,观察组VGR低于对照组,GT高于对照组,差异有统计学意义($P < 0.05$ 和 $P < 0.01$);术后6个月,观察组GT高于对照组,差异有统计学意义($P < 0.05$)。术后3、6个月,观察组与对照组的VGR、GT与术前相比,差异均有统计学意义($P < 0.01$);PD、KTH术前术后相比差异无统计学意义($P > 0.05$)(见表1)。

2.2 病人满意度 病人满意度中,2 组间术前 PCS、HS、PES 差异均无统计学意义($P > 0.05$);术后 3 个月时 2 组 HS 比较,差异有统计学意义($P < 0.01$)。术后 6 个月时 PCS、PES 2 组间差异均无统计学意义($P > 0.05$),而 HS 在 2 组间差异有统计学意义($P < 0.01$)。术后 3、6 个月时 2 组 PCS、HS、PES 与术前相比,差异均有统计学意义($P < 0.01$);术后 6 个月时 PES 与术后 3 个月相比,差异有统计学意义($P < 0.01$)(见表 2)。最后根据 VAS 量化后,算出病人总满意度,观察组病人总满意度高于对照组,差异有统计学意义($P < 0.05$)(见表 3)。

表 1 2 组 PD、VGR、KTH、GT 的比较($\bar{x} \pm s$)

分组	<i>n</i>	术前	术后 3 个月	术后 6 个月
PD				
观察组	25	1.43 ± 0.35	1.30 ± 0.27	1.35 ± 0.26
对照组	24	1.39 ± 0.28	1.35 ± 0.29	1.32 ± 0.28
<i>t</i>	—	0.43	0.66	0.32
<i>P</i>	—	>0.05	>0.05	>0.05
VGR				
观察组	25	4.01 ± 0.54	0.33 ± 0.21 **	0.40 ± 0.19 **
对照组	24	4.05 ± 0.47	0.47 ± 0.25 **	0.51 ± 0.25 **
<i>t</i>	—	0.24	2.02	1.66
<i>P</i>	—	>0.05	<0.05	>0.05
KTH				
观察组	25	3.21 ± 0.64	3.48 ± 0.71	3.48 ± 0.59
对照组	24	3.27 ± 0.56	3.49 ± 0.63	3.50 ± 0.69
<i>t</i>	—	0.36	0.02	0.15
<i>P</i>	—	>0.05	>0.05	>0.05
GT				
观察组	25	0.94 ± 0.20	1.56 ± 0.42 **	1.65 ± 0.46 **
对照组	24	0.85 ± 0.19	1.18 ± 0.46 **	1.28 ± 0.52 **
<i>t</i>	—	1.54	3.02	2.60
<i>P</i>	—	>0.05	<0.01	<0.05

组内比较;与术前比较 ** $P < 0.01$

一般来说,进行根面覆盖的结缔组织瓣的必要为厚度为 1.5~2.0 mm,因此,供体部位的腭部软组织的厚度至少应有 3 mm,因而对于薄龈生物型病人可能无法提供足够厚度;(3)若为带上皮的结缔组织瓣,则愈合后可能会出现与邻近区域颜色不一致的情况;(4)该手术精准度要求较高,术者必须经过严格的手术训练才可进行。CAF 单独使用或联合其他手术被认为是治疗 Miller I、II GR 中最常用的手术方案,但在 CAF + CTG 联合使用后仅获得了有限的再附着的生成^[19]。因此,许多能够刺激组织再生的材料被提出以获得更好的愈合效果^[16,20-21]。

表 2 病人满意度的比较($\bar{x} \pm s$)

分组	<i>n</i>	术前	术后 3 个月	术后 6 个月
PCS				
观察组	25	5.07 ± 0.38	6.29 ± 0.57 **	6.34 ± 0.56 **
对照组	24	5.14 ± 0.57	6.14 ± 0.46 **	6.34 ± 0.49 **
<i>t</i>	—	0.51	1.01	0.02
<i>P</i>	—	>0.05	>0.05	>0.05
HS				
观察组	25	6.14 ± 0.81	3.22 ± 1.03 **	3.00 ± 0.91 **
对照组	24	6.32 ± 0.51	4.70 ± 0.68 **	4.60 ± 0.98 **
<i>t</i>	—	0.91	5.91	5.90
<i>P</i>	—	>0.05	<0.01	<0.01
PES				
观察组	25	5.01 ± 0.14	6.16 ± 1.06 **	6.92 ± 0.57 **##
对照组	24	5.07 ± 0.21	6.07 ± 0.90 **	6.74 ± 0.49 **##
<i>t</i>	—	1.33	0.30	1.17
<i>P</i>	—	>0.05	>0.05	>0.05

组内比较;与术前比较 ** $P < 0.01$;与术后 3 个月比较## $P < 0.01$

表 3 2 组总满意率比较

分组	<i>n</i>	满意	不满意	满意率/%	χ^2	<i>P</i>
观察组	25	24	1	96.00		
对照组	24	17	7	70.80	3.98	<0.05
合计	49	41	8	83.67		

3 讨论

牙周治疗的首要目的是消除牙周疾病并维持牙齿及其支持组织的健康和功能。最近,牙周治疗越来越注重美学效果,其范围已超过牙齿替换和牙齿颜色,而是包括了周围软组织的颜色。GR 是牙周组织最常见的美学和功能问题之一。

CTG 联合 CAF 被认为是目前治疗 GR 的手术金标准^[16-18],但 CTG 的临床应用仍有其局限性:(1)需要开辟第二术区来提供结缔组织瓣,增加了病人的痛苦及术后体验感;(2)对供区要求较高,一

PRF 是第二代血小板浓缩物,是血小板中 PDGF、TGF- β 、IGF 等生长因子的浓缩悬浮液。众所周知,PRF 可以加速伤口愈合,当与各种根面覆盖手术一起使用时,还可以加速硬组织和软组织的成熟^[22-23]。分子研究^[24]表明,PRF 可以在 21 d 内持续释放生长因子,并在 7 d 内达到峰值。CTG 是治疗 Miller I、II GR 的较为可靠的膜龈手术方法操作创伤小,既可减轻病人术后疼痛等不适感,又可减少因手术带来的美学缺陷。本研究结果显示,KTH 在

2 组术前术后差异均无统计学意义,与 ASTI 等^[25] 研究结果相似,但有一项与此相反的结果显示 KTH 长期增加与膜龈联合的顶端移动相关^[26]。这可能是由于评估时间过短而引起。

本次实验中,2 组都获得了良好的根面覆盖,这包括了垂直牙龈高度的恢复和 GT 的增加,特别是 GT 在观察组比对照组有显著性的增加。有研究^[27] 称,GT 的增加对于稳定的临床结果以及 6~9 个月 后出现的爬行附着至关重要。

本次研究中,病人满意度方面观察组具有明显的优势。PES、PCS 的研究结果与 AGARWAL 等^[28] 相似,认为 PRF 中的同质纤维蛋白网络被认为是含有血小板、生长因子和细胞因子的促进软组织愈合的生物材料^[29-30]。HS 在 2 组间差异有统计学意义,这可能与研究中获得了根面覆盖有很大关系^[31]。

通过本次研究得出 PRF + CAF 与 CAF 在治疗 Miller I、II GR 均能获得较好的效果。2 组在所有的临床评估参数里除了 KTH 均有明显改善,而且在治疗效果里更倾向于观察组。这个结果与 GULNIHAL 等^[32-33] 报道结果相似。

总之,PRF + CAF 和 CAF 可以成功治疗 Miller I、II GR,临床实验结果提示 PRF + CAF 可能替代结缔组织移植植物且在病人满意度方面更优于结缔组织移植瓣,从而有助于克服自体移植技术的相关限制。然而,还必须进行进一步的长期临床和组织学研究,以验证该技术的有效性。

[参 考 文 献]

- [1] PATEL M, NIXON PJ, CHAN MF. Gingival recession: part I: Aetiology and non-surgical management[J]. Br Dent J, 2011, 211 (6): 251.
- [2] JATI AS, FURQUIM LZ, CONSOLARO A. Gingival recession: its causes and types, and the importance of orthodontic treatment [J]. Dental Press J Orthod, 2016, 21 (3): 18.
- [3] MILLER PD. Root coverage using the free tissue auto graft citric acid application. III. A successful and predictable procedure in deep wide recession[J]. Int J Periodontics Restorative Dent, 1985, 5: 15.
- [4] HARRIS RJ, HARRIS AW. The coronally positioned pedicle graft with and inlaid margins: A predictable method of obtaining root coverage of shallow defects [J]. Int J Periodontics Restorative Dent, 1995, 14: 229.
- [5] LANGER B, LANGER L. Sbu epithelial connective tissue graft technique for root coverage [J]. J Periodontol, 1985, 56: 715.
- [6] PiNI PG, CLAUSER C, CORTELLINI P, et al. Guided tissue regeneration versus mucogingival surgery in the treatment of human buccal recession. A 4-year follow-up study [J]. J

Periodontol, 1996, 67: 1216.

- [7] DEL CORSO M, SAMMARTINO G, DOHAN EHRENFEST DM. Clinical evaluation of a modified coronally advanced flap alone or in combination with a platelet-rich fibrin membrane for the treatment of adjacent multiple gingival recessions: a 6-month study [J]. J Periodontol, 2009, 80: 1694.
- [8] CHAMBRONE L, LIMA LA, PUSTIGLIONI FE, et al. Systematic review of periodontal plastic surgery in the treatment of multiple recession-type defects [J]. J Can Den Assoc, 2009, 75 (3): 203a.
- [9] CHOUKROUN J, DISS A, SIMONPIERI A, et al. Platelet-rich fibrin (PRF): A second generation platelet concentrate: Part I: Technological concepts and evolution [J]. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 2006, 101: E37.
- [10] CASTRO AB, MESCHI N, TEMMERMAN A, et al. Regenerative potential of leucocyte- and platelet-rich fibrin. Part A: intra-bony defects, furcation defects and periodontal plastic surgery. A systematic review and meta-analysis [J]. J Clin Periodontol, 2017, 44 (1): 67.
- [11] ZHOU S, SUN C, HUANG S, et al. Efficacy of adjunctive bioactive materials in the treatment of periodontal intrabony defects: a systematic review and meta-analysis [J]. Biomed Res Int, 2018, 2018: 15.
- [12] HUSEYIN GK, GULEN K, EBRU OE, et al. The adjunctive effect of platelet-rich fibrin to connective tissue graft in the treatment of buccal recession defects: result of a randomized, parallel-group controlled trial [J]. J Periodontol, 2015, 86: 1221.
- [13] MILLER PD JR. A classification of marginal tissue recession [J]. Int J Periodontics Restorative Dent, 1985, 5: 8.
- [14] VANDANA KL, SAVITHA B. Thickness of gingiva in association with age, gender and dental arch location [J]. J Clin Periodontol, 2005, 32: 828.
- [15] DE SANCTIS M, ZUCHELLI G. Coronally advanced flap: A modified surgical approach for isolated recession-type defects: Three-year result [J]. J Clin Periodontol, 2007, 34: 262.
- [16] AROCA S, KEGLEVICH T, BARIERI B, et al. Clinical evaluation of a modified coronally advanced flap alone or in combination with a platelet-rich fibrin membrane for the treatment of adjacent multiple gingival recession: A 6-month study [J]. J Periodontol, 2009, 80: 244.
- [17] CAIRO F, NIERI M, PAGLIARO U. Efficacy of periodontal plastic surgery procedures in the treatment of localized facial gingival recessions. A systematic review [J]. J Clin Periodontol, 2014, 41: S44.
- [18] DAI A, HUANG JP, DING PH, et al. Long-term stability of root coverage procedures for single gingival recessions: A systematic review and meta-analysis [J]. J Clin Periodontol, 2019, 46: 572.
- [19] KECELI HG, KAMAK G, ERDEMIR EO, et al. The adjunctive effect of platelet-rich fibrin to connective tissue graft in the treatment of buccal recession defects: Results of a randomized, parallel-group controlled trial [J]. J Periodontol, 2015, 86: 1221.
- [20] JENABIAN N, MOTALLEBNEJAD M, ZAHEDI E, et al. Coronally advanced flap and connective graft with or without plasma rich in

- growth factors (PRGF) in treatment of gingival recession [J]. J Clin Exp Dent, 2018, 10: e431.
- [21] KUKA S, IPCI SD, CAKAR G, *et al.* Clinical evaluation of coronally advanced flap with or without platelet-rich fibrin for the treatment of multiple gingival recession [J]. Clin Oral Investigations, 2018, 22: 1551.
- [22] ANIKUMAR K, GGGTHA A, UMASUDHAKAR, *et al.* Platelet-rich fibrin; A novel root coverage approach [J]. J Indian Soc Periodontol, 2009, 13(1): 50.
- [23] 徐济群, 胡茂能, 黄伟, 等. 富血小板纤维蛋白在伴有骨缺损的牙即刻种植中的临床应用 [J]. 蚌埠医学院学报, 2021, 46(12): 1684.
- [24] DOHAN DM, CHOUKROUN J, DISS A, *et al.* Platelet-rich fibrin (PRF): a second-generation platelet concentrate. Part II: platelet-related biologic features [J]. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 2006, 101(3): e45.
- [25] ASTI RD, AGUS S, YANTI R, *et al.* The treatment of gingival recession with coronally advanced flap with platelet-rich fibrin [J]. Dental J, 2019, 52(1): 8.
- [26] THAMARAISELVAN M, ELAVARASU S, GADAGI J, *et al.* Comparative clinical evaluation of coronally advanced flap with or without platelet-rich fibrin membrane in the treatment of isolated gingival recession [J]. J Indian Soc Periodontol, 2015, 19(1): 66.
- [27] HARRIS RJ. The connective tissue with partial thickness double pedicle graft: The results of 100 consecutively-treated defects [J]. J Periodontol, 1994, 65: 448.
- [28] AGARWAL SK, JHINGRAN R, BAINS VK, *et al.* Patient-centered evaluation of microsurgical management of gingival recession using coronally advanced flap with platelet-rich fibrin or amnion membrane: A comparative analysis [J]. Eur J Dent, 2016, 10: 121.
- [29] JAIN R, KUDVA P, KUMAR R. Periodontal microsurgery-magnifying facts, maximizing results [J]. J Adv Med Dent Sci Res, 2014, 2: 24.
- [30] PATEL JS, PATEL SG, KADAM C. Choukroun's platelet rich fibrin in regenerative dentistry [J]. Univ Res J Dent, 2013, 3: 22.
- [31] CORTELLINI P, TONETTI M, BALDI C, *et al.* Does placement of a connective tissue graft improve the outcomes of coronally advanced flap for coverage of single gingival recessions in upper anterior teeth? A multi-centre, randomized, double-blind, clinical trial [J]. J Clin Periodontol, 2009, 36: 68.
- [32] GULNIHAL E, GUL A. Platelet-rich fibrin in the treatment of bilateral gingival recessions [J]. J Periodontol, 2012, 2(3): 154.
- [33] RAJAN P, ANDE S, PAVALURI AK, *et al.* A split mouth randomized controlled study to evaluate the adjunctive effect of platelet-rich fibrin to coronally advanced flap in Miller's class- I and II recession defects [J]. J Indian Soc Periodontol, 2003, 17(5): 631.

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- [4] LIU J J, SHEN R, CHEN L, *et al.* Piwil2 is expressed in various stages of breast cancers and has the potential to be used as a novel biomarker [J]. Int J Clin Exp Pathol, 2010, 3(4): 328.
- [5] 何朝辉, 唐福才, 曹正国, 等. Piwil2 在膀胱尿路上皮癌组织中的表达及临床意义 [J]. 现代泌尿生殖肿瘤杂志, 2018, 10(2): 79.
- [6] CARTER BA, PAGE DL. Phyllodes tumor of the breast: local recurrence versus metastatic capacity [J]. Hum Pathol, 2004, 35(9): 1051.
- [7] 蒋梅, 柯晓斌. 乳腺叶状囊肉瘤 1 例报告并文献复习 [J]. 现代肿瘤医学, 2014, 22(2): 339.
- [8] 肖昆, 孙庭. Piwil2 与肿瘤的关系及研究进展 [J]. 江西医药, 2013, 48(3): 256.
- [9] 李跃波, 冯定庆, 凌斌, 等. Piwil2 基因表达诱导 NIH3T3 细胞恶性转化 [J]. 安徽医科大学学报, 2013, 48(5): 467.
- [10] TAUBERT H, WACH S, JUNG R, *et al.* Piwil2 expression is correlated with disease specific and progression free survival of chemotherapy treated bladder cancer patients [J]. Mol Med, 2015, 21(1): 371.
- [11] SARVESTANI FM, SAFAEI A, TALEI A, *et al.* The evaluation of cancer testis gene PIWIL2 expression levels as a new prognostic biomarker for breast cancer [J]. Clin Lab, 2016, 62(8): 1469.
- [12] 贾慧丽, 徐芸. Piwil2 基因在肝癌组织中 mRNA 及蛋白的表达 [J]. 世界华人消化杂志, 2012, 20(34): 3385.
- [13] POUYANFAR N, MONABBATI A, SHARIFI AA, *et al.* Expression levels of MMP9 and PIWIL2 in prostate cancer: a case-control study [J]. Clin Lab, 2016, 62(4): 651.
- [14] LEE JH, SCHÜTTE D, WULF G, *et al.* Stem-cell protein Piwil2 is widely expressed in tumors and inhibits apoptosis through activation of Stat3/Bcl-XL pathway [J]. Hum Mol Genet, 2006, 15(2): 201.
- [15] FENG D, YAN K, ZHOU Y, *et al.* Piwil2 is reactivated by HPV oncoproteins and initiates cell reprogramming via epigenetic regulation during cervical cancer tumorigenesis [J]. Oncotarget, 2016, 7(40): 64575.

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