

doi: 10.13241/j.cnki.pmb.2023.03.011

无托槽隐形矫治技术矫治重度牙周炎伴咬合紊乱患者的 临床牙周指标及疗效分析*

赵 晶 冯小东 肖永芳 宋铁砾 刘 冰

(首都医科大学附属北京同仁医院口腔科 北京 100730)

摘要 目的:探讨与分析无托槽隐形矫治技术对重度牙周炎伴咬合紊乱患者临床牙周指标的影响。**方法:**选择 2019 年 1 月到 2021 年 5 月在本院诊治的重度牙周炎伴咬合紊乱患者 90 例作为研究对象, 根据简单分配原则把患者分为隐形组与传统组各 45 例。传统组给予传统直丝弓固定矫治技术治疗, 隐形组给予无托槽隐形矫治技术治疗, 两组都治疗观察 6 个月。在矫治前及矫治 6 个月后观察牙周指标, 并检测龈沟液中细胞因子含量。**结果:**治疗后隐形组的总有效率为 97.8%, 与传统组的 84.4% 相比显著提高 ($P<0.05$)。治疗后两组的临床牙周指数都明显低于治疗前, 隐形组与传统组相比也显著降低 ($P<0.05$)。两组治疗后的血清 IL-1 β 与 TNF- α 含量明显低于治疗前, 隐形组与传统组相比也明显降低 ($P<0.05$)。治疗期间隐形组的牙龈萎缩、牙周粘连、牙根吸收、牙釉脱矿等并发症发生率为 6.7%, 明显低于传统组的 24.4% ($P<0.05$)。**结论:**无托槽隐形矫治技术早期矫治重度牙周炎伴咬合紊乱能抑制龈沟液炎症因子的表达, 能改善牙龈指数与菌斑指数, 提高疗效, 减少并发症。

关键词:无托槽隐形矫治技术; 重度牙周炎; 咬合紊乱

中图分类号: R781.4 文献标识码: A 文章编号: 1673-6273(2023)03-457-04

Clinical Periodontal Indexes and Curative Effect Analysis of Bracketless Invisible Orthodontic Technique in Patients with Severe Periodontitis and Occlusal Disorder*

ZHAO Jing, FENG Xiao-dong, XIAO Yong-fang, SONG Tie-li, LIU Bing

(Stomatology department, Beijing Tongren Hospital Affiliated to Capital Medical University, Beijing, 100730, China)

ABSTRACT Objective: To explore and analyze the effect of invisible orthodontic treatment without brackets on clinical periodontal indexes in patients with severe periodontitis and occlusal disorder. **Methods:** A total of 90 patients with severe periodontitis and occlusal disorders who were diagnosed and treated in our hospital from January 2019 to May 2021 were selected as the research subjects. According to the simple allocation principle, the patients were divided into the invisible group and the traditional group with 45 cases each. The traditional group was treated with traditional straight wire fixation orthodontic technique, and the invisible group was treated with invisible orthodontic technique without brackets. Both groups were treated for 6 months. Periodontal indexes were observed before and 6 months after orthodontic treatment, and cytokine levels in gingival crevicular fluid were detected. **Results:** After treatment, the total effective rate of the invisible group was 97.8%, which was higher than that of the traditional group (84.4%) ($P<0.05$). The clinical periodontal index in both groups was lower than before treatment, and the invisible group was also lower compared to the conventional group ($P<0.05$). The levels of serum IL-1 β and TNF- α in the two groups after treatment were lower than those before treatment ($P<0.05$), and the invisible group was also lower than that in the traditional group ($P<0.05$). During the treatment period, the incidence of complications such as gingival recession, periodontal adhesion, root resorption, and enamel demineralization in the invisible group was 6.7%, which was lower than that in the traditional group (24.4%) ($P<0.05$). **Conclusion:** Bracket-free invisible orthodontic treatment can inhibit the expression of inflammatory factors in gingival crevicular fluid, improve the gingival index and plaque index, promote the improvement of treatment effect and reduce complications in the early treatment of severe periodontitis with occlusal disorder.

Key words: Bracketless invisible orthodontic technique; Severe periodontitis; Occlusal disorder

Chinese Library Classification(CLC): R781.4 **Document code:** A

Article ID: 1673-6273(2023)03-457-04

前言

牙周炎是口腔科的常见病,其发病早期临床症状不明显^[1,2]。但是随着病情的进展,很多重度牙周炎伴随有咬合紊乱,且发

* 基金项目: 国家自然科学基金面上项目(81870697)

作者简介: 赵晶(1968-),女,硕士,副主任医师,研究方向: 口腔科, E-mail: zhaojz0608@163.com

(收稿日期: 2022-05-23 接受日期: 2022-06-19)

现咬合紊乱可能作为一种危险因素,导致牙周病发展加重,从而形成恶性循环^[3,4]。特别是在创伤作用下,重度牙周炎患者的余留牙易松动移位,严重者发生余留牙咬合不良,并出现颞下颌关节功能紊乱,严重影响患者颜面特征、美观特征及口腔卫生健康^[9]。随着医学观念的进步与人民生活水平的提高,选择进行口腔正畸治疗的患者逐年增加^[6,7]。不过传统托槽矫治器口内粘接面积较大,存在结扎丝扎嘴、复诊时间较长等特点,容易引起细菌斑块积聚^[8]。无托槽隐形矫治技术具有美观性、隐蔽性等特点,常被临床广泛应用于牙齿排齐、间隙关闭、倾斜的治疗,可帮助口腔恢复正常咬合状态,从而改善牙周炎患者的临床症状^[9,10]。本文具体探讨与分析了无托槽隐形矫治技术早期矫治重度牙周炎伴咬合紊乱的效果,以明确无托槽隐形矫治技术的应用价值与机制。现报道如下。

1 资料与方法

表 1 两组一般资料

Table 1 Two groups of general data

Groups	n	Dental crowding degree (mm)	Body mass index (kg/m ²)	Gender (male / female)	Disease course (month)	Age (year)	Anclassification (Class I / Class II / Class III)
Invisible group	45	10.44± 1.11	22.48± 1.11	23/22	8.28± 0.14	24.50± 1.14	22/10/13
Traditional group	45	10.48± 0.87	22.91± 0.82	24/21	8.34± 0.29	24.65± 1.17	23/12/10

1.2 治疗方法

正畸治疗前,患者均接受牙周基础治疗,经诊断确认牙周炎处于静止期后再开始正畸治疗,牙周治疗和正畸治疗均由同一牙医和同一正畸医生完成。

传统组:进行传统固定矫治技术治疗,矫正前利用 X 线确认患者的牙槽骨状况,选择 3M 直丝弓矫治器对牙齿进行排列。上、下颌粘托槽,整平排齐牙列,矫治 4 周后复诊,更换弓丝,加力调整。

隐形组:进行无托槽隐形矫治技术治疗,检查并评估患者矫治前后全口牙齿状况,在专业设计软件辅助下为其定制针对性的无托槽隐形矫治器。并叮嘱患者注意每日佩戴时间需保持在 20 小时左右,并每隔 2 周更换下一付矫治器。

两组都治疗观察 6 个月。

1.3 观察指标

(1)在治疗后进行疗效判定,显效:牙齿排列整齐,上颌前牙上下咬合、覆盖情况正常,间隙闭合;有效:牙齿排列基本整齐,上颌前牙上下咬合、覆盖覆盖情况显著好转;无效:无达到上述标准甚或恶化。(显效+有效)/组内例数×100.0%=总有效率。

(2)分别于矫治前及矫治后 6 个月进行牙周检查,由同一

1.1 研究对象

选择 2019 年 1 月到 2021 年 5 月在本医院诊治的中重度牙周炎伴咬合紊乱患者 90 例作为研究对象。

纳入标准:符合中重度牙周炎伴咬合紊乱的诊断标准;均伴有牙槽骨吸收、牙龈萎缩、牙齿松动、前牙移位等情况;年龄 18-55 岁;面型较好,上下唇均位于审美平面上或以内者;具有矫治指征;患者依从性良好,自愿参与本研究;本次研究经医院伦理委员会批准。

排除标准:治疗资料不全者;矫治禁忌症者;面部创伤或面部手术史者;拔牙矫治者;合并传染性疾病者;妊娠、哺乳期女性;认知功能障碍者;凝血功能障碍者。

根据简单分配原则把患者分为隐形组与传统组各 45 例,两组一般资料对比无差异($P>0.05$)。见表 1。

名牙周医师完成,检测指标包括牙龈指数、菌斑指数、探诊深度和牙龈出血指数。牙周袋探诊深度取一颗牙 6 个探诊位点的平均值。

(3)在治疗前后用滤纸条浸润法收集患者的龈沟液,按照体质比 1:1 比例加入 PBS 缓冲液震荡。取出滤纸后,将标本放入 -80℃ 保存待检。采用酶联免疫法检测龈沟液白细胞介素-1 β (Interleukin-1, IL-1 β) 和肿瘤坏死因子- α (Tumor necrosis factor, TNF- α) 水平。

(4)记录与观察所有患者在治疗期间出现的牙龈萎缩、牙周粘连、牙根吸收、牙釉脱矿等并发症情况。

1.4 统计方法

采用 SPSS25.00 软件对本研究数据进行分析, $P<0.05$ 为差异具有统计学意义。计数资料以[n(%)]表示,使用 χ^2 检验进行比较。计量数据采用均数±标准差表示,行 t 检验,检验水准为 $\alpha=0.05$ 。

2 结果

2.1 总有效率对比

治疗后隐形组的总有效率为 97.8%,与传统组的 84.4%相比显著提高($P<0.05$)。见表 2。

表 2 两组治疗后总有效率对比(n)

Table 2 Total response rate after treatment between the two groups (n)

Groups	n	Excellence	Valid	Invalid	Total effective rate
Invisible group	45	41	3	1	44(97.8%) ^b
Traditional group	45	25	13	7	38(84.4%)

Note: Compared with before treatment, ^a $P<0.05$; Compared with the Traditional group, ^b $P<0.05$, the same below.

2.2 临床牙周指数变化对比

相比也显著降低($P<0.05$)。见表3。

治疗后两组的临床牙周指数较治疗前低,隐形组与传统组

表3 两组治疗前后牙龈指数、探诊深度、菌斑指数及牙龈出血指数变化对比(均数±标准差)

Table 3 Comparison of changes in gingival index, plaque index, probing depth and gingival crevicular bleeding index between the two groups before and after treatment (mean± standard deviation)

Groups	n	Gingival index		Probing depth		Plaque index		Bleeding index	
		Pretherapy	Post-treatment	Pretherapy	Post-treatment	Pretherapy	Post-treatment	Pretherapy	Post-treatment
Invisible group	45	2.39± 0.20	1.14± 0.14 ^{ab}	4.97± 0.32	2.32± 0.26 ^{ab}	2.18± 0.17	1.15± 0.11 ^{ab}	1.65± 0.54	1.05± 0.31 ^{ab}
Traditional group	45	2.36± 0.18	1.25± 0.18 ^a	4.98± 0.24	3.18± 0.28 ^a	2.15± 0.19	1.24± 0.18 ^a	1.62± 0.51	1.26± 0.52 ^a

2.3 血清 IL-1 β 与 TNF- α 含量变化对比

与传统组相比也明显降低($P<0.05$)。见表4。

两组治疗后血清 IL-1 β 与 TNF- α 含量较治疗前低,隐形组

表4 两组治疗前后血清 IL-1 β 与 TNF- α 含量变化对比(mg/L, 均数±标准差)

Table 4 Change of serum IL-1 and TNF-content before and after treatment (mg/L, mean ± standard deviation)

Groups	n	IL-1 β		TNF- α	
		Pretherapy	Post-treatment	Pretherapy	Post-treatment
Invisible group	45	22.58± 1.48	14.59± 2.10 ^{ab}	16.31± 2.18	5.42± 0.35 ^{ab}
Traditional group	45	22.18± 1.38	18.39± 1.55 ^a	16.29± 1.11	8.65± 1.16 ^a

2.4 并发症情况对比

矿等并发症发生率为6.7%,明显低于传统组的24.4%($P<0.05$)。

治疗期间隐形组的牙龈萎缩、牙周粘连、牙根吸收、牙釉脱 见表5。

表5 治疗期间并发症发生情况对比(n)

Table 5 Comparison of complications (n)

Groups	n	Gingival atrophy	Periodontal adhesion	Dental root resorption	Dental glaze demineralization	Summation
Invisible group	45	0	1	1	1	3(6.7%)
Traditional group	45	3	3	2	3	11(24.4%)

3 讨论

牙周炎在发病前期具有一定的自限性,但疾病后期会出现牙齿松动、移位,进而发生错牙合畸形症状,可造成牙面菌斑聚集,影响患者牙齿美观及功能,形成重度牙周炎伴咬合紊乱^[11,12]。现代研究认为控制咬合与治疗牙周病息息相关,即使咬合紊乱不是牙周炎发病始动因素,但其可能是造成牙周病发展加重的一种危险因素^[13]。重度牙周炎伴咬合紊乱多需要矫治正畸治疗,其治疗原则为消除牙周炎症与减少牙合创伤,最大限度保留患牙,复位移位牙齿。传统固定矫治技术为治疗重度牙周炎伴咬合紊乱的常规方法,具有操作方便、成功率高等优势,但是对于患者的创伤,容易影响患者牙齿的美观及口腔生理环境^[14,15]。

本研究显示:治疗后隐形组的总有效率为97.8%,与传统组的84.4%相比显著提高;治疗期间隐形组的牙龈萎缩、牙周粘连、牙根吸收、牙釉脱矿等并发症发生率为6.7%,明显低于传统组的24.4%,表明无托槽隐形矫治技术早期矫治重度牙周炎伴咬合紊乱能促进提高治疗效果,减少并发症的发生。分析

可知,无托槽隐形矫治技术具有简便、美观、佩戴舒适等优势,以牙齿邻面粘结附件、去釉等方式使牙列排齐。且无托槽隐形矫治技术可依据患者口腔情况制定矫治器,对口腔黏膜刺激较小,且其易于拆卸,便于患者进行清洗,可有效降低并发症情况发生^[16,17]。此外,无托槽隐形矫治器可覆盖机体牙冠大部分位置,降低牙周粘连,改善牙周组织情况,防止发生龈上菌斑迁徙造成牙周组织损坏,防止牙龈萎缩,从而从整体上降低并发症的发生^[18]。

重度牙周炎伴咬合紊乱为口腔科常见错牙合畸形,属于牙齿畸形的一种。传统治疗重度牙周炎伴咬合紊乱的方法可减少弓丝与托槽沟间的摩擦力,但无法有效降低其对牙周组织的刺激性损伤,无法从整体上改善患者的牙周状况^[19,20]。本研究显示治疗后治疗前后两组临床牙周指数均低于治疗前,隐形组与传统组相比也显著降低;表明无托槽隐形矫治技术早期矫治重度牙周炎伴咬合紊乱能改善牙龈炎症、出血等。该结果与许妍^[21]的报道具有相似性。分析可知,无托槽隐形矫治技术在治疗过程中可自由摘取和佩戴,佩戴后可起到隐形效果,不会对患者

的正常进食造成影响。无托槽隐形矫治器完全符合患者自身牙齿错落结构,降低邻牙伸长的发生率,有助于进一步改善其牙齿舒适度和咀嚼程度,佩戴后不会产生强烈的异物感,可保障患者的舒适度^[22,23]。无托槽隐形矫治器可在饮食时自由取下,有利于改善患者口腔内部的生理环境,避免了食物残渣残留于矫治器内的状况,有效减少牙周菌斑数量^[24]。

在重度牙周炎伴咬合紊乱的发生、发展过程,机体会伴随大量且多种类炎症细胞因子的参与,这些因子可能作用于牙周组织重建及修复中^[25]。特别是随着患者病情的进展,细菌与相邻牙组织将会产生一些产物进而进入龈沟液,与此同时口腔所残存致的病菌以血液循环系统作为渠道,导致机体引发慢性炎症,经分析发现龈沟液成分可用于评估机体炎症程度^[26]。本研究显示两组治疗后的血清 IL-1 β 与 TNF- α 含量明显低于治疗前,隐形组与传统组相比也明显降低,表明无托槽隐形矫治技术早期矫治重度牙周炎伴咬合紊乱能抑制龈沟液炎症因子的表达。分析可知,IL-1 β 与 TNF- α 可直接或者间接促进骨吸收,但当其过渡分泌时,将会不断加重机体炎性反应,并抑制金属蛋白酶组织抑制因子的活性,进而造成牙周组织修复能力的损伤,不利于患者康复^[27]。无托槽隐形矫治技术在应用过程中,可通过持续小范围应力促进牙齿移动,无需弓丝及托槽,且不损伤牙周组织^[28]。且无托槽隐形矫治技术采用透明高分子材料,还可紧贴牙齿,可满足患者对美观度的需求,不会产生口腔异物感^[29]。此外,无托槽隐形矫治技术在对于牙齿美观度具有增强作用的同时,也可减少因咬合力所产生的损伤,促进面部恢复,可对牙列拥挤患者产生矫治效果,从而抑制炎症因子的表达^[30]。但本研究对患者进行长期的调查,设置的组别也比较少,将在后续研究中探讨。

综上所述,无托槽隐形矫治技术早期矫治重度牙周炎伴咬合紊乱能抑制龈沟液炎症因子的表达,能改善牙龈指数与菌斑指数,探诊深度及牙周出血指数,能促进提高牙周治疗效果,减少正畸及牙周并发症的发生。

参考文献(References)

- [1] Serrano C, Suarez E. Prevalence of Severe Periodontitis in a Colombian Adult Population[J]. J Int Acad Periodontol, 2019, 21(2): 53-62
- [2] Wang I C, Askar H, Ghassib I, et al. Association between periodontitis and systemic medication intake: A case-control study [J]. J Periodontol, 2020, 91(10): 1245-1255
- [3] Wang S H, Ni W C, Wang R F. Treating severe periodontitis with staged load applied implant restoration: A case report[J]. World J Clin Cases, 2020, 8(10): 2028-2037
- [4] Gomes-Filho IS, Balinha IDSCE, da Cruz SS, et al. Moderate and severe periodontitis are positively associated with metabolic syndrome[J]. Clin Oral Investig, 2021, 25(6): 3719-3727
- [5] Gomes-Filho IS, Coelho JMF, Miranda SS, et al. Severe and moderate periodontitis are associated with acute myocardial infarction [J]. J Periodontol, 2020, 91(11): 1444-1452
- [6] Zieniewska I, Maciejczyk M, Zalewska A. The Effect of Selected Dental Materials Used in Conservative Dentistry, Endodontics, Surgery, and Orthodontics as Well as during the Periodontal Treatment on the Redox Balance in the Oral Cavity [J]. Int J Mol Sci, 2020, 21(24): 9684
- [7] Golub L M, Lee H M. Periodontal therapeutics: Current host-modulation agents and future directions [J]. Periodontol 2000, 2020, 82(1): 186-204
- [8] Shaik JA, Guram G. A Comparative Evaluation of Canine Retraction Using Ceramic Bracket and Ceramic Bracket with Metal Slot with Conventional Preadjusted Edgewise Appliance Bracket Systems: A Clinical Study [J]. J Int Soc Prev Community Dent, 2018, 8 (4): 296-303
- [9] Shen X, Yu Z. The effects of bracketless invisible orthodontics on the PLI, SBI, SPD, and GI and on the satisfaction levels in children with malocclusions[J]. Am J Transl Res, 2021, 13(5): 5066-5072
- [10] 周勇全, 侯万邦, 余侠, 等. 无托槽隐形矫治器对成人拔牙患者上中切牙压低效率的影响[J]. 重庆医学, 2021, 50(16): 5
- [11] Feres M, Retamal-Valdes B, Fermiano D, et al. Microbiome changes in young periodontitis patients treated with adjunctive metronidazole and amoxicillin[J]. J Periodontol, 2021, 92(4): 467-478
- [12] Alqaderi H, Goodson J M, Agaku I. Association between sleep and severe periodontitis in a nationally representative adult US population [J]. J Periodontol, 2020, 91(6): 767-774
- [13] Passanezi E, Sant'Ana ACP. Role of occlusion in periodontal disease [J]. Periodontol 2000, 2019, 79(1): 129-150
- [14] Suwanpravit W, Lertpimonchai A, Thienpramuk L, et al. Metabolic syndrome and severe periodontitis were associated in Thai adults: A cross-sectional study[J]. J Periodontol, 2021, 92(10): 1420-1429
- [15] Postnikov MA, Trunin DA, Pankratova NV, et al. Ortodonticheskoe lechenie zuboal'veoliarnoi formy mezial'noi okkluzii u detei 6-12 let apparatom Postnikova, litsevoi maskoi i breket-sistemoi [Orthodontic treatment of malocclusion Class III in patients aged 6-12 by Postnikov appliance, face mask and bracket system][J]. Stomatologiya (Mosk), 2018, 97(1): 59-62
- [16] Wang G, Yang L, Zhang YF, et al. A retrospective study on incisor root resorption in patients treated with bracketless invisible appliance and straight wire appliance [J]. Shanghai J stomat, 2017, 26 (1): 121-124
- [17] 余智爽, 邓怡. 无托槽隐形矫治器关闭邻面去釉间隙的生物力学研究[J]. 实用口腔医学杂志, 2020, 36(5): 4
- [18] 石敏, 王红, 张静, 等. 无托槽隐形矫治器与直丝弓矫治器治疗牙周炎伴错合畸形的疗效比较[J]. 河北医学, 2020, 26(2): 5
- [19] Kaku M, Matsuda S, Kubo T, et al. Generalized periodontitis treated with periodontal, orthodontic, and prosthodontic therapy: A case report[J]. World J Clin Cases, 2021, 9(21): 6110-6124
- [20] Gibas-Stanek M, Pihut M. Safe Debonding of Fixed Appliances: A Comparison of Traditional Techniques and LODI Devices on Different Bracket Types in Terms of Enamel Cracks, Site of Bond Failure, and Bracket Reusability [J]. Int J Environ Res Public Health, 2021, 18(19): 10267
- [21] 许妍, 熊纪敏, 王威, 等. 无托槽隐形矫治成人牙周炎伴前牙深覆牙合患者的初步研究[J]. 临床口腔医学杂志, 2019, 35(6): 4
- [22] 姚希, 黄轶, 任志鹏, 等. 无托槽隐形矫治器用于牙周病患者的临床疗效研究[J]. 重庆医学, 2020, 49(S02): 3
- [23] 周小渝, 王梦琳, 王红梅, 等. Invisalign 无托槽隐形矫治技术推磨牙向远中的研究进展[J]. 临床和实验医学杂志, 2020, 19(11): 4

- 专业委员会. 中国脓毒症/脓毒性休克急诊治疗指南(2018)[J]. 感染、炎症、修复, 2019, 20(1): 3-22
- [14] 中华医学会急诊医学分会, 中华危重病急救医学杂志编辑委员会, 脓毒症并发弥散性血管内凝血诊治急诊专家共识专家组. 脓毒症并发弥散性血管内凝血诊治急诊专家共识[J]. 中华危重病急救医学, 2017, 29(7): 577-580
- [15] 刘丹蕾, 许卓谦, 瞿长春, 等. 早期胃肠康复治疗机械通气的脓毒症伴急性胃肠损伤患者的有效性和安全性:34 例前瞻性、随机对照、先导试验[J]. 南方医科大学学报, 2019, 39(11): 1298-1304
- [16] "D-二聚体检测" 急诊临床应用专家共识组. "D-二聚体检测" 急诊临床应用专家共识 [J]. 中华急诊医学杂志, 2013, 22(8): 827-836
- [17] 廖宴, 戴娟, 黄文龙, 等. 不同分级及转归脓毒症患者血清 PCT、D-D、CRP 及血小板相关参数检测的临床意义[J]. 现代生物医学进展, 2020, 20(18): 3453-3456, 3452
- [18] Jhang WK, Park SJ. Evaluation of Sepsis-Induced Coagulopathy in Critically Ill Pediatric Patients with Septic Shock [J]. Thromb Haemost, 2021, 121(4): 457-463
- [19] Chen CB, Hammo B, Barry J, et al. Overview of Albumin Physiology and its Role in Pediatric Diseases [J]. Curr Gastroenterol Rep, 2021, 23(8): 11
- [20] 杨江江, 王东海, 杨娜, 等. 白蛋白替代治疗纠正脓毒症患者低白蛋白血症作用的倾向性评分匹配研究 [J]. 中华急诊医学杂志, 2020, 29(3): 409-412
- [21] Tseng CH, Chen TT, Wu MY, et al. Resuscitation fluid types in sepsis, surgical, and trauma patients: a systematic review and sequential network meta-analyses[J]. Crit Care, 2020, 24(1): 693
- [22] Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)[J]. JAMA, 2016, 315(8): 801-810
- [23] 张春侠, 蔡盈, 丁可, 等. 4 种评分系统对脓毒症患儿预后的预测价值[J]. 临床急诊杂志, 2020, 21(12): 991-995
- [24] 樊寻梅, 宋国维. 小儿危重病例评分法(草案)临床应用的评价[J]. 中华儿科杂志, 1998, 36(10): 3-6
- [25] 中国研究型医院学会休克与脓毒症专业委员会, 中国人民解放军重症医学专业委员会, 重症免疫研究协作组, 等. 脓毒症免疫抑制诊治专家共识[J]. 中华危重病急救医学, 2020, 32(11): 1281-1289
- [26] Huang X, Hu H, Sun T, et al. Plasma Endothelial Glycocalyx Components as a Potential Biomarker for Predicting the Development of Disseminated Intravascular Coagulation in Patients With Sepsis[J]. J Intensive Care Med, 2021, 36(11): 1286-1295
- [27] 中华医学会急诊医学分会, 中国医师协会急诊医师分会, 中国人民解放军急救医学专业委员会, 等. 脓毒症液体治疗急诊专家共识[J]. 中华急诊医学杂志, 2018, 27(1): 30-38
- [28] Castro R, Kattan E, Ferri G, et al. Effects of capillary refill time-vs. lactate-targeted fluid resuscitation on regional, microcirculatory and hypoxia-related perfusion parameters in septic shock: a randomized controlled trial[J]. Ann Intensive Care, 2020, 10(1): 150
- [29] 温伟, 张新超. 乳酸 -- 反映组织与器官低灌注的良好指标[J]. 中国急救医学, 2018, 38(12): 1039-1041
- [30] Daga MK, Rohatgi I, Mishra R, et al. Lactate enhanced-quick Sequential Organ Failure Assessment 2 (LqSOFA2): A new score for bedside prognostication of patients with sepsis [J]. Indian J Med Res, 2021, 154(4): 607-614

(上接第 460 页)

- [24] Robertson L, Kaur H, Fagundes NCF, et al. Effectiveness of clear aligner therapy for orthodontic treatment: A systematic review [J]. Orthod Craniofac Res, 2020, 23(2): 133-142
- [25] Slots J. Life-threatening pathogens in severe/progressive periodontitis: Focal infection risk, future periodontal practice, role of the Periodontology 2000[J]. Periodontol, 2000, 2020, 84(1): 215-216
- [26] Lombardo G, Pardo A, Signorello C, et al. Hyperbaric oxygen therapy for the treatment of moderate to severe periodontitis: a clinical pilot study[J]. Undersea Hyperb Med, 2020, 47(4): 571-580
- [27] Aleksandrowicz P, Brzezińska-Błaszczyk E, Kozłowska E, et al. Analysis of IL-1 β , CXCL8, and TNF- α levels in the crevicular fluid of patients with periodontitis or healthy implants [J]. BMC Oral Health, 2021, 21(1): 120
- [28] d'Apuzzo F, Perillo L, Carrico CK, et al. Clear aligner treatment: different perspectives between orthodontists and general dentists[J]. Prog Orthod, 2019, 20(1): 10
- [29] Tamer İ, Öztaş E, Marşan G. Orthodontic Treatment with Clear Aligners and The Scientific Reality Behind Their Marketing: A Literature Review[J]. Turk J Orthod, 2019, 32(4): 241-246
- [30] Cortona A, Rossini G, Parrini S, et al. Clear aligner orthodontic therapy of rotated mandibular round-shaped teeth: A finite element study[J]. Angle Orthod, 2020, 90(2): 247-254