

A classification of alveolar ridge bone defects considering implant timing

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Abstract

Introduction: Alveolar ridge bone defect is caused by bone resorption after tooth extraction for various reasons. In clinical work, various types of alveolar ridge are often encountered. In the literature, different scholars from different starting points or clinical concerns have proposed different classifications of bone defect types, although each classification has its own advantages and disadvantages. The classification of alveolar ridge defect types will bring many advantages to clinical work and help clinicians make appropriate clinical decisions based on the classification.

Methods: Learned from the classifications of alveolar bone defects in previous literatures. In this paper, we propose a classification of alveolar bone defects considering implant timing.

Results: After tooth loss, the alveolar ridge show different bone profile or contour, which could be roughly divided into two categories, namely unhealed alveolar ridge and healed alveolar ridge. Immediate implant and early implant were often associated with unhealed alveolar ridge, while delayed implant was often associated with healed alveolar ridge. According to the shape or bone defect morphology of alveolar ridge, the classification is as follows:

	Illustration	Classification	Description	Implant timing	Suggestion			
Unhealed alveolar ridge		1A	Fresh socket without defect of labial bone plate and no soft tissue recession	Immediately implant	Flapless	Duel zone bone graft or Socket shield technique	STG with thin biotype	Temporary restoration; Individual healing abutment
		1B	Fresh socket, labial bone plate damaged within the coronal 1/3, no soft tissue recession	Immediately implant	Flap or Flapless	Duel zone bone graft or GBR	STG with thin biotype	Temporary restoration; Individual healing abutment
		1C	Fresh socket, labial bone plate damaged beyond the coronal 1/3, no soft tissue recession	Immediately implant or Early implant	Flap//Flapless	GBR// IDR technique; Triple Graft; The three-layer technique; MMC Technique	—	Temporary restoration; Individual healing abutment
		1D	Fresh socket, labial bone plate intact, chronic inflammation with bone fenestration apically, no soft tissue recession	Immediately implant or Early implant	Flap	GBR	—	Temporary restoration; Individual healing abutment
		1E	4-8 weeks after tooth extraction, the labial bone plate was damaged, the soft tissue was healed and the ridge was slightly collapsed. Bone fenestration; Bone dehiscence	Early implant	Flap	GBR	—	—
		1F	There is large area of bone destruction, acute or chronic inflammation around the root tip or adjacent to important anatomical structures, the implant primary stability cannot be obtained.	Delay implant	Flap or Flapless	ARP	Socket seal; Open healing	—
Healed alveolar ridge		2A	Sufficient bone volume to permit restoration-oriented implant placement; Soft tissue is also sufficient	Simultaneous Implant placement	Flap or Flapless	—	—	—
		2B	Sufficient bone volume to permit restoration-oriented implant placement; Soft tissue is insufficient	Simultaneous Implant placement	Flap	No bone augmentation or Xenograft for contour augmentation	STG if needed	—
		2C	Horizontal bone resorption allows restoration oriented implant placement, favorable bone defect, implant can be located within the bone arch contour, bone dehiscence, implant surface exposure is less than 5mm	Simultaneous Implant placement	Flap	GBR	STG if needed	—
		2D	Initial stability can be achieved by allowing a restoration-oriented implant placement, with bone fenestrated defect	Simultaneous Implant placement	Flap	GBR	—	—
		2E	Moderate to severe horizontal bone defect, unfavorable bone defect, but no vertical bone defect	Staged Implant placement	Flap	Onlay or GBR with reinforced membrane	Soft tissue management	—
		2F	There were bone defects both horizontally and vertically	Staged Implant placement	Flap	Ti-mesh; GBR with reinforced membrane;BBA/SBB	Soft tissue management	—

Conclusion: According to this classification, it has good guiding significance for clinical work. We can also give corresponding surgical techniques.

