GUIDE WHEEL

User Manual

Ver.1



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Development Background

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GUIDE WHEEL

1. Factors for Successful Implant

1) Patient

- Patient's systematic health status, numbers and location of missing teeth, remaining alveolar bone in edentulous area etc.

2) Implant components

- Types or sizes of fixture, types of superior structure etc.

3) Surgery

- Clinician's experience or sensation.

※ Especially the moment of fixture placement is decisive for the treatment

2. Importance of Fixture's Location and Direction

- In case of prosthetics, fixture's location and direction are crucial.
- According to the drilling sequence, fixture placement location is going to be decided, and the final drilling and the placement location is going to be decided by initial drill. (Fig 1)
- Slight direction alteration is possible until the second step, but very difficult in following steps.
- Therefore, initial drilling and positioning are the most important factors in prosthetic setting and successful implant. (Fig 2)
- In conclusion, implant treatment planning can be seen as a plan for successful initial drilling.

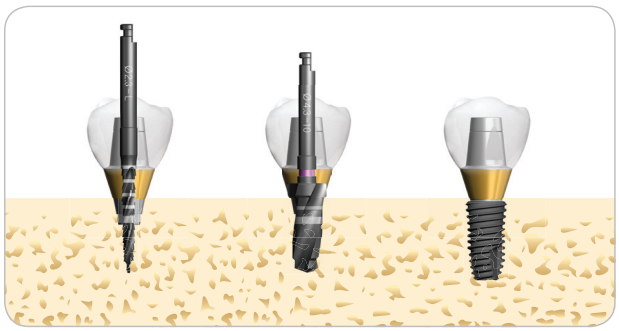


Fig.1 Fixture placementis depended on drilling sequences

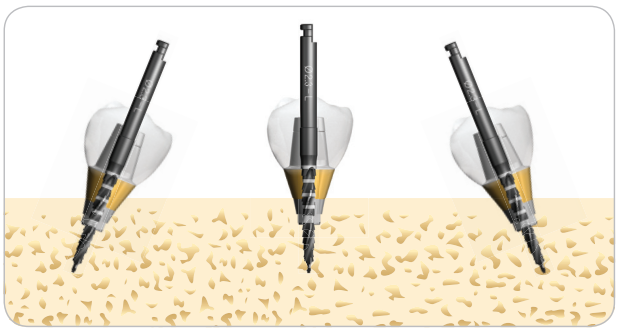


Fig.2 Superior prosthetic morphology is depended on initial drilling

3.Results of Erroneous Fixture Placement

- Lack of spaces for prosthetics
- Increased failure rates due to failure in masticatory force distribution
- Increased prosthetic remakes
- Increased stress for clinician

4. Importance of Surgical Stents

- Actual implementation in surgery is as important as treatment planning.
- Therefore, surgical stent is the most recommended method of actual implementation.

* Surgical stent limits initial drills' location and angulation, and therefore restrict the drill's freedom. Refer to Table 1 for surgical stent classification.
* However, pre-existing surgical stents limit treatment plan alterations in case of unexpected situations during surgeries.

Table 1. Surgical Stent Classifications[1)]

Group	Subgroup
A. Diagnostic template	
B. Surgical template (Surgical guide)	(1) Nonlimiting design
	(2) Partially limiting design
	(3) Completely limiting design*
	① Physical surgical guide** (CT + CAD/CAM system → RP SLA)
	② Image guide surgery(scannograhy)***

* Form that only determines the placement location
** Form that determines placement location and direction
*** Form that determines placement location, direction, and depth
[1)] Lee JY, Yoon Y, Oh NS, JKAP 214,52, 4, 366 -75, The use of surgical guide stent for implant replacement

5. Ideal Surgical Guide

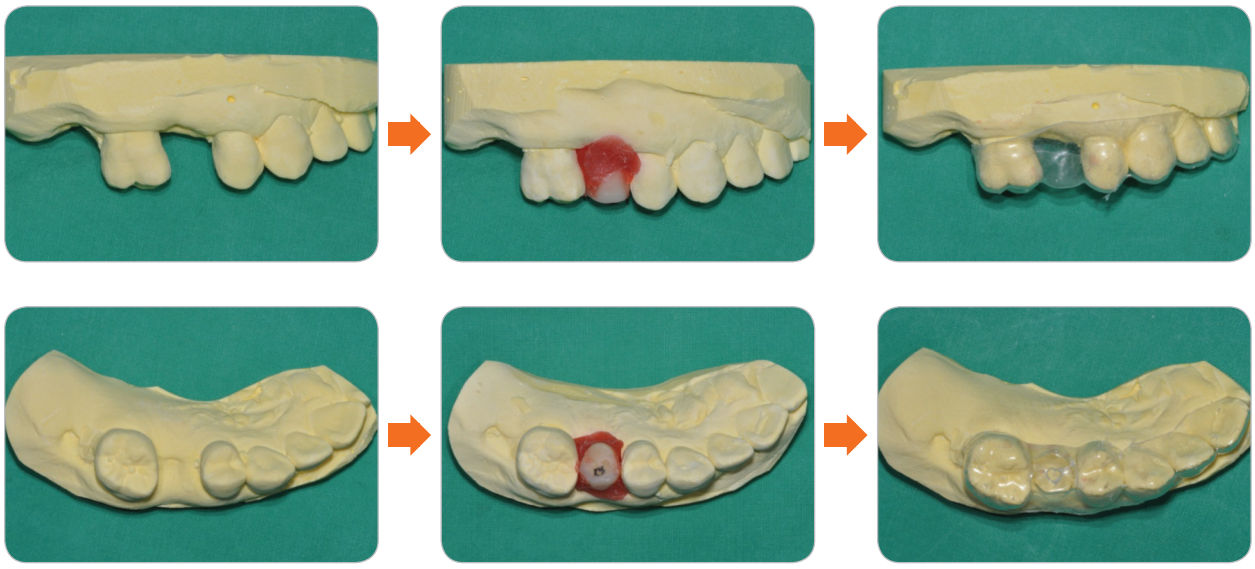
- Guide that helps the clinician to drill at the accurate placement location
- Able to predict final drill and diameter of superior prosthetics
- Able to secure a clear view during surgery
- Irrigation is possible during surgery
- Convenience
- Competitive price

6. Three Types of Commonly Used Surgical Stents

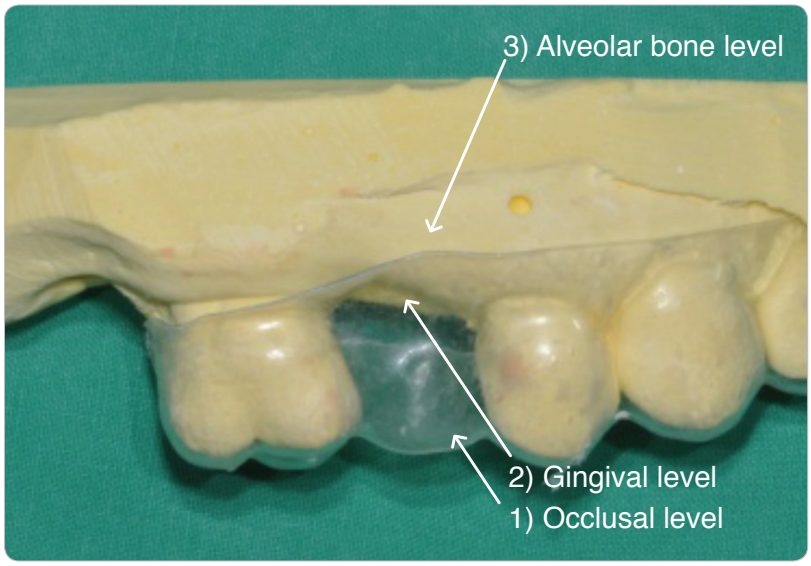
1) In-Office Conventional Surgical Stent

After making the superior prosthetic form on the edentulous area using artificial teeth, the outward form of the stent is made by vacuum molding using clear plastic, and then a hole is made on the occlusal surface for the drill to pass through.

- There is inconvenience in stent production.

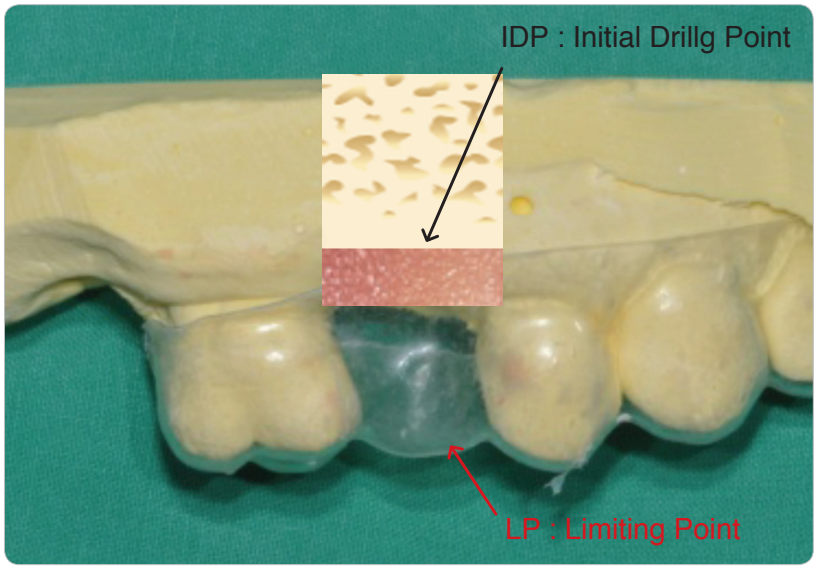


Common surgical stent production method using plaster casts
After locating artificial teeth, produce an outward form by vaccum molding and make a hole in the middle of the occlusal surface.

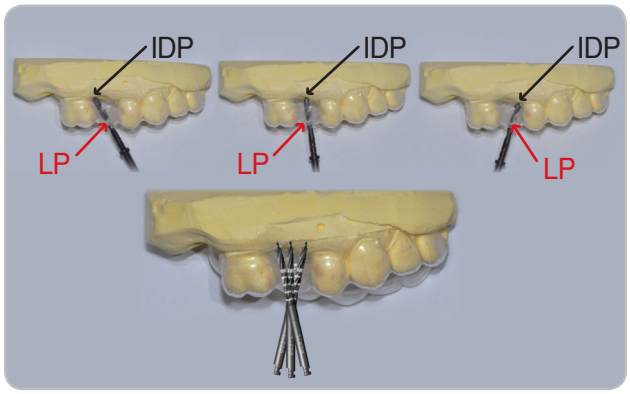


The stent can limit the drill's location in three levels.
1) The middle of the occlusal surface of superior prosthetics
2) Middle of the gingival of the edentulous area
3) Middle of the alveolar bone in edentulous area

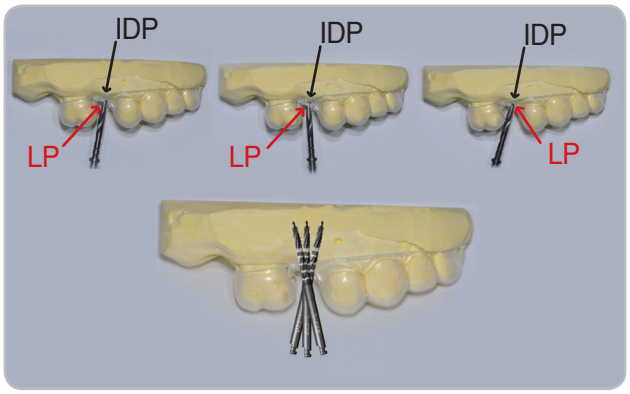
• Even though the production of the stent is inconvenient, the drill's location changes because alveolar bone surface is not usually exposed unless the flap is opened during surgery and be cause it is covered with gingiva of various thicknesses.



Location of occlusal level LP and IDP in surgical stent
IDP is not indicated on the stent and is located under the gingiva, and therefore, it is difficult to recognize the exact location before opening the flap.



Problem of surgical stent produced at occlusal level
Even though the drill's location is limited at LP, because the drill's movement is only limited at a single point, the location of IDP is altered depending on the drill's angle.



Problem of surgical stent produced at gingival level
Although the movement is less than that of stent produced at occlusal level, IDP location is altered depending on the drill angle because the angle is not limited.

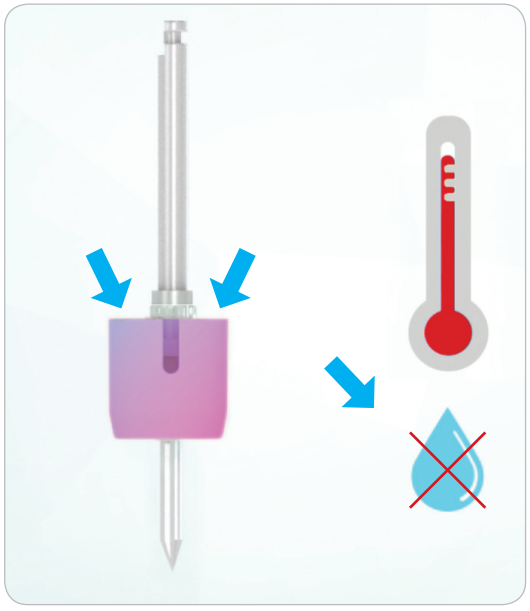
2) Lab Fabricated Surgical Stent

Drilling path is assumed considering the drill location and direction passing through imaginary teeth on the edentulous area. Then a hollow path is made or a metal tube (bushing, sleeve) is placed on the stent following the drilling path. The rest is filled with clear silicone.



Lab fabricated surgical stent

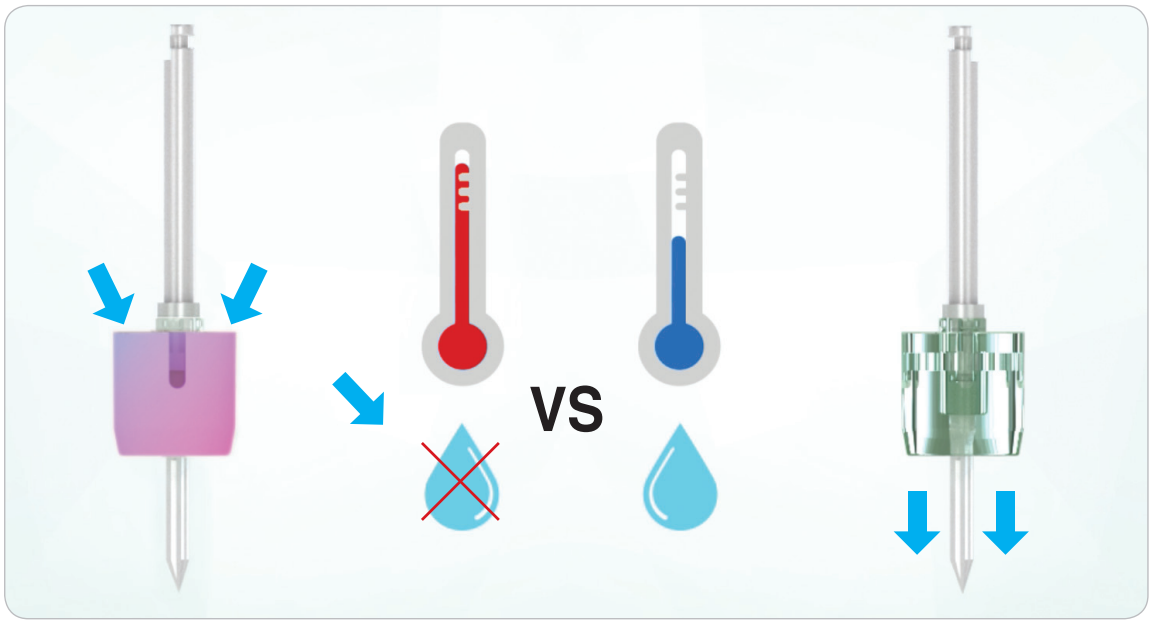
- Surgery cost increases due to additional technical costs.
- The drill diameter and resin of the stent or the metal of the sleeve can be grinded and therefore inner angle differences may occur.
- Intra osseous temperature increases as irrigation cannot reach the drilling point.



3) CT related Surgical Guide System

Surgical guide system that interworks with CT depending on the manufacturer and produces stents using 3D printers depending on the product.

- Surgical guide production cost is burdening.
- Apart from the SIMPLE GUIDE that uses open sleeve, general surgical guides that use closed sleeve cannot be cooled, and therefore increases intraosseous temperature.







II

Product Characteristics

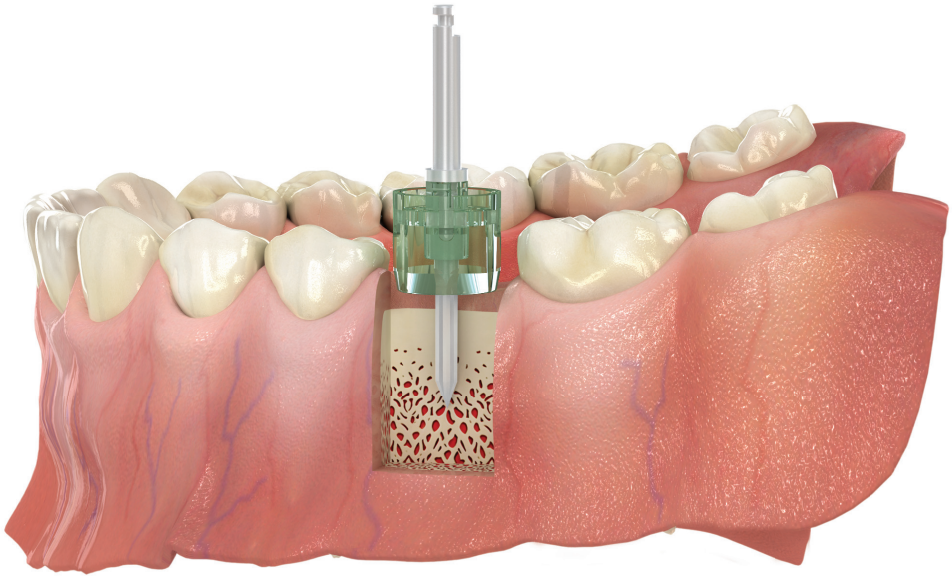
1. Characteristics of Guide Wheel
2. Indications of Guide Wheel
3. Advantages of Guide Wheel
4. Components of Guide Wheel
5. Differentiation of Guide Wheel

GUIDE WHEEL

1. Characteristics of Guide Wheel

- This is a disposable surgery equipment that helps determine initial drilling point and path that secures safety margin by imaging superior prosthetic component size and form.
- Superior component production is more convenient as the prosthetic form can be assumed considering the harmony with adjacent teeth.
- This helps finding fixture covered in gingiva in the second surgery.

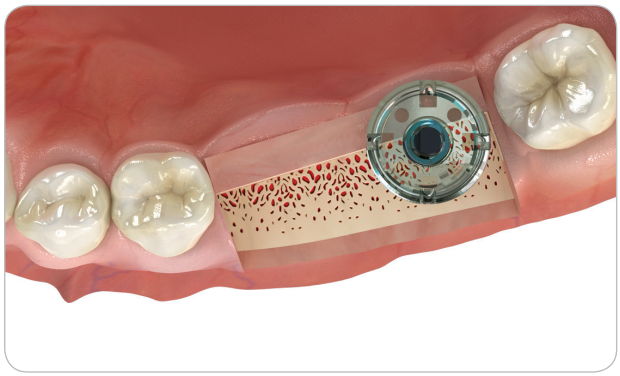
※ It is difficult to apply in a multiple case such as full mouth rehabilitation, but it is a useful substitute of surgical stent in a general case in which single or 2~3 implants are placed.



2. Indications of Guide Wheel

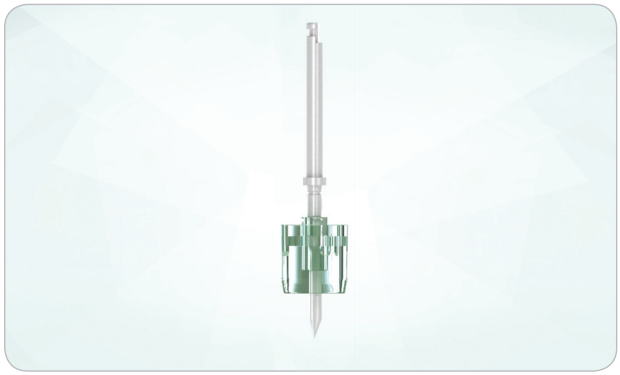
- Patients whose initial point and path determination is critical for final prosthetic production.
- Patients who want speedy operation by clinical technique improvement.

3. Advantages of Guide Wheel



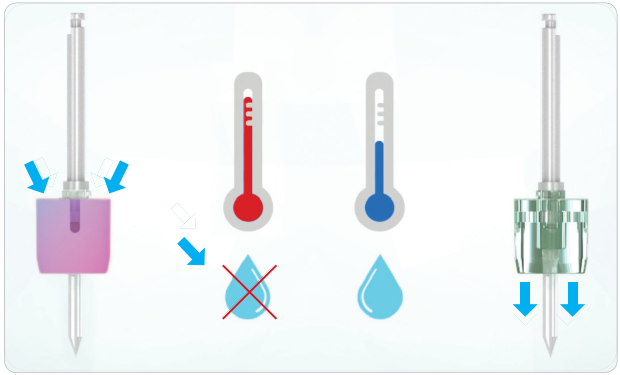
1. Visible operation

Views of operation is secured through clear materials.



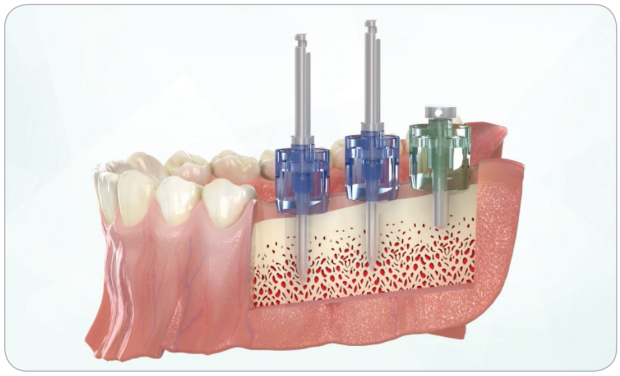
2. Easy to use

Straight use after connecting to special drill.



3. Low bone heating

Low bone heating is possible due to the inner irrigation.

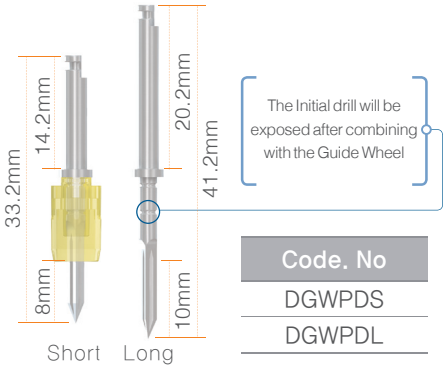


4. High frequencies in practical uses

- Can be both used in single case and multiple cases.
- In comparison with adjacent teeth, surgery time is reduced because of quick andprecise determination of placement location.

4. Components of Guide Wheel

Guide Wheel Initial Drill



Code. No
DGWPDS
DGWPDL

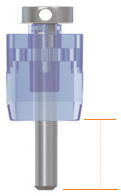
Guide Wheel



▶ Connect to the initial drill to easily determine the initial drilling point and path.

Code. No	DGW6	DGW7	DGW8	DGW9	DGW10	DGW12
color	Yellow	Pink	Blue	Green	Black	Clear
Size	Ø6	Ø7	Ø8	Ø9	Ø10	Ø12

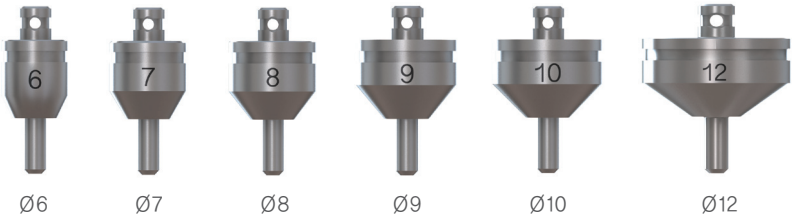
Guide Pole



Use after locking Guide Wheel

Code. No
DGWGP

Guide Pin



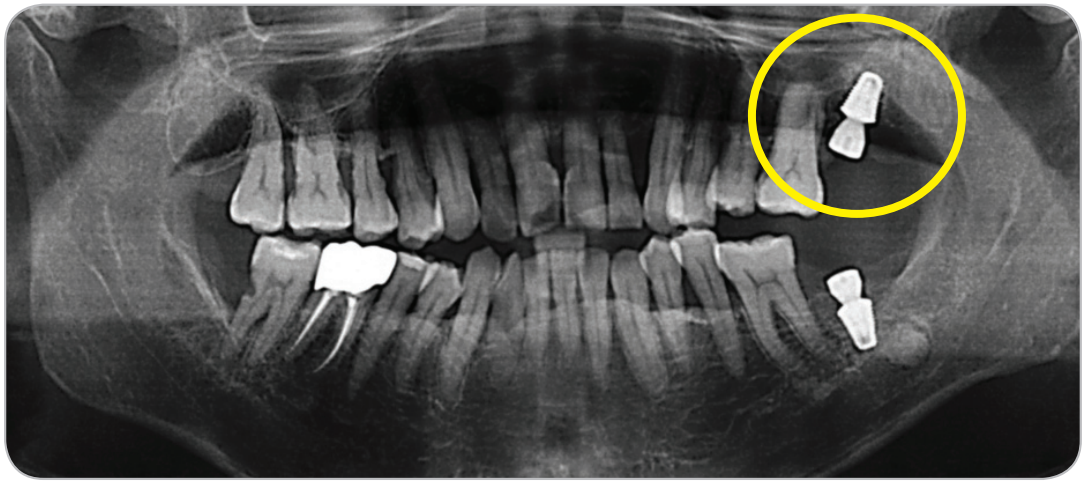
▶ Conveniently used for multiple implant placement

▶ Used to select the virtual position of a tooth by fixing on the hole where drilling has been completed.

Code. No	DGWP6	DGWP7	DGWP8	DGWP9	DGWP10	DGWP12
Size	Ø6	Ø7	Ø8	Ø9	Ø10	Ø12

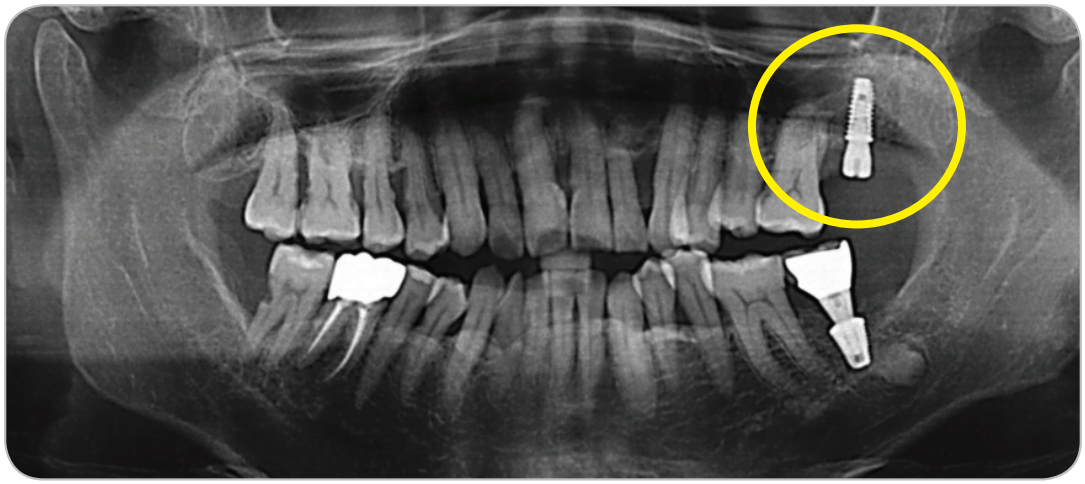
5. Distinction of Guide Wheel

1) When the Guide Wheel is not being used



- Increasing surgery time due to difficulties in determining drill location and direction
- Limits in implementing treatment plan in a real surgery
- Remove fixture when it is determined that alteration is impossible at prosthetic level

2) When the Guide Wheel is being used



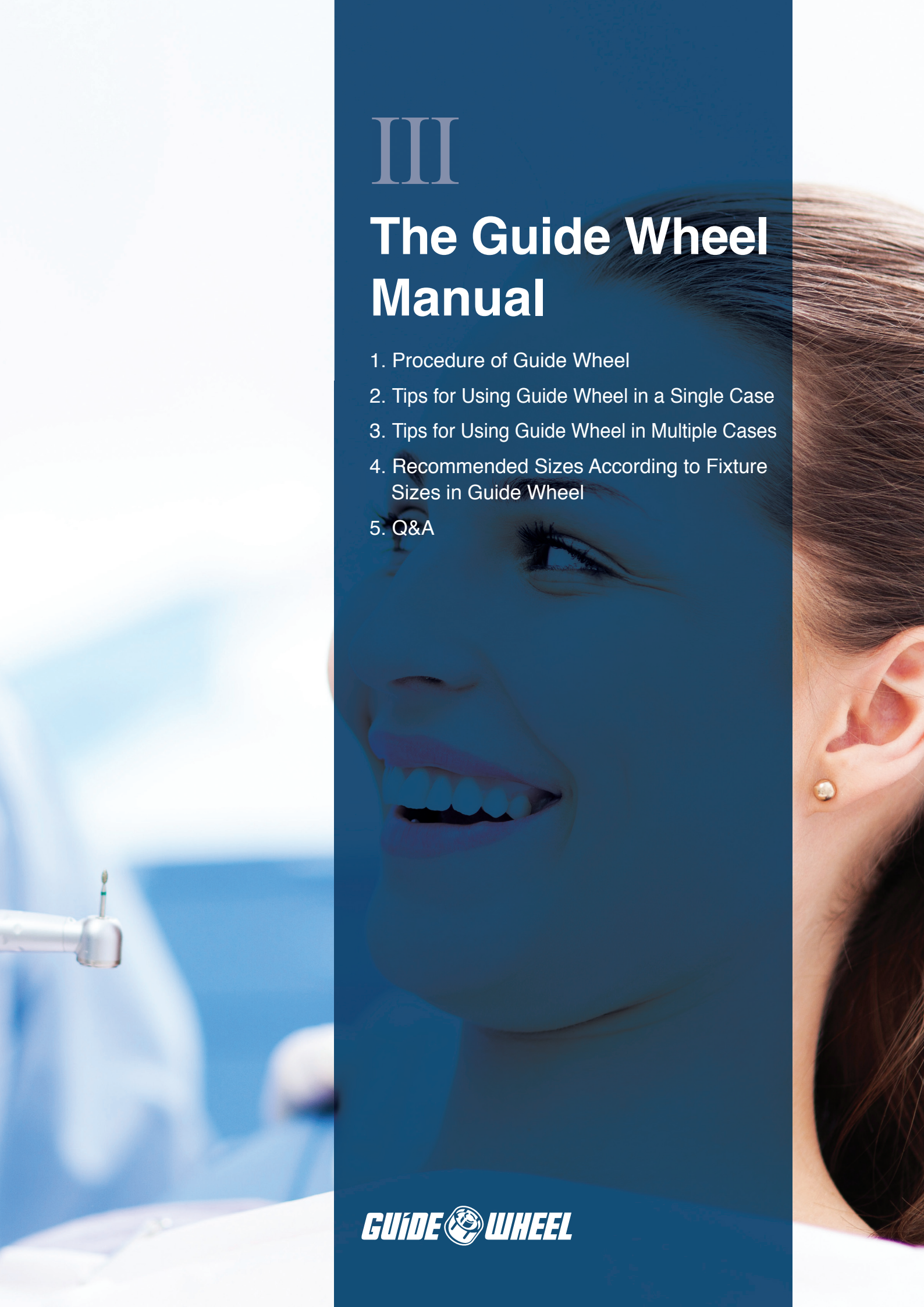
- Reduces surgery time
- Convenient use without complicated pre-surgery stent production
- Find more accurate initial drilling point as it is directly applied at bone levels
- Determine the drilling location and direction in comparison with adjacent teeth
- Comfortable operation can be done and a clear view is secured
- Effective in implementing a planned treatment in a real surgery



III

The Guide Wheel Manual

1. Procedure of Guide Wheel
2. Tips for Using Guide Wheel in a Single Case
3. Tips for Using Guide Wheel in Multiple Cases
4. Recommended Sizes According to Fixture Sizes in Guide Wheel
5. Q&A



GUIDE WHEEL

1. Procedure of Guide Wheel

① Treatment Planning

• Assess the form and location of surrounding anatomic components using radiographs or CT aken before surgery.

- General considerations such as distance from underlying nerves and maxillary sinus is important, but it is especially important to check the crown form and root curvature of adjacent teeth
- If adjacent root is long and severely curved and therefore intrudes the edentulous area, the treat ment plan needs to include a counter plan for this
- Evaluate the occlusional relationship with antagonistic teeth and determine the number of fixtures, diameter and make a plan for edentulous area
- Generally the fixture is placed in the middle of the adjacent teeth. In clinical situations, the fixture can be placed more mesially or distally depending on patient's economical status, absence of antagonistic teeth, and limitation of maximum mouth opening. Therefore, such factors need to be considered when determining the location.

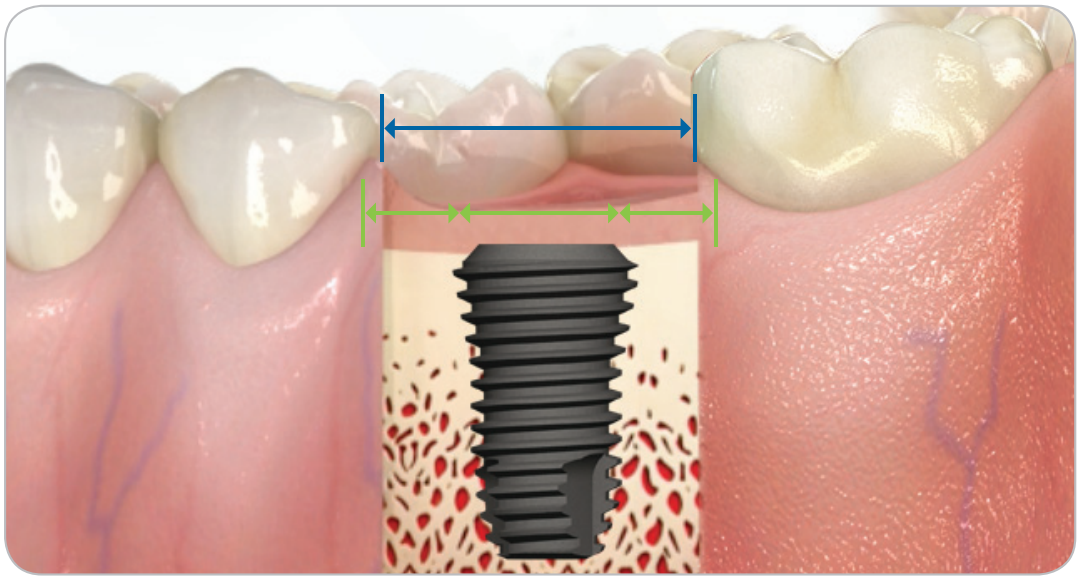
② The Size Decision of Guide Wheel

• The mesio-distal distance between adjacent teeth in edentulous area is measured at gingival level using a probe.

- Based on the measured distance and considering the safety margin of both sides, the fixture diameter is determined.

• The Guide Wheel diameter is easily calculated by subtracting the height of contour thickness of both adjacent teeth from the mesio-distal distance measured above.

• If one wishes to install the fixture in the middle, choose the diameter that contacts both adjacent teeth at the proximal surface. And if one wishes to tilt the fixture intentionally or install at an uncommon angle, a smaller diameter should be chosen.

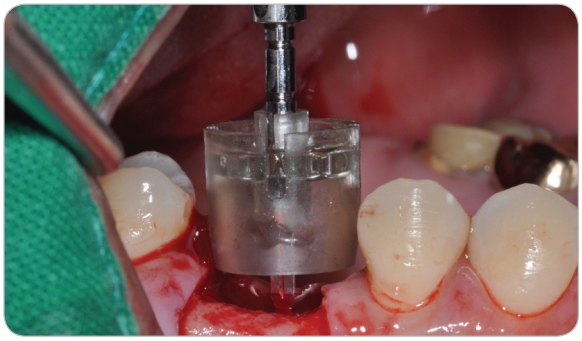


③ The Connection of Guide Wheel

• After connecting the drill and hand piece, operate the engine to check whether it is connected at the exact location.

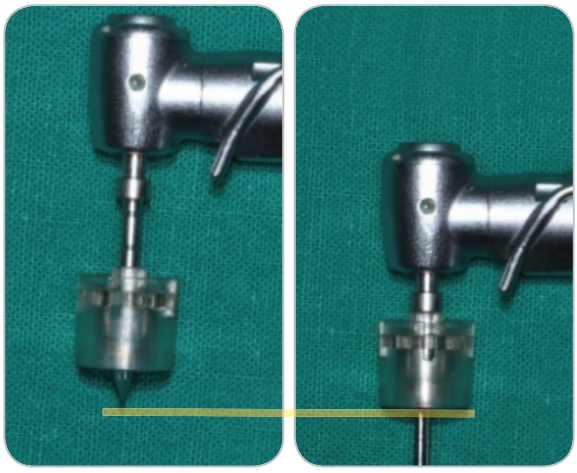
④ The Verification of Guide Wheel's Location

After opening the flap and locating the drill on the exposed alveolar bone surface, check whether it is parallel to the crown portion of adjacent teeth and to the patient's occlusal plane, using the colored line on the side of the Guide Wheel.



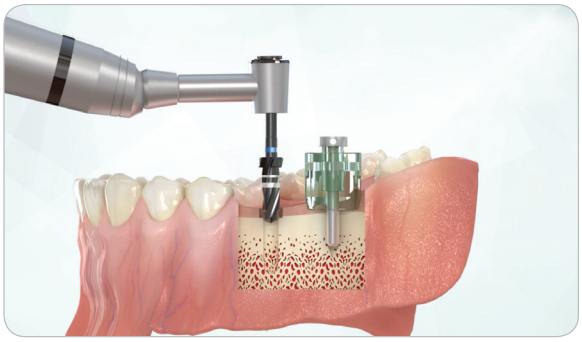
⑤ Guide Wheel Drilling

The initial drill does not have to be drilled full length as only the drilling in the compact bone is important at that stage.



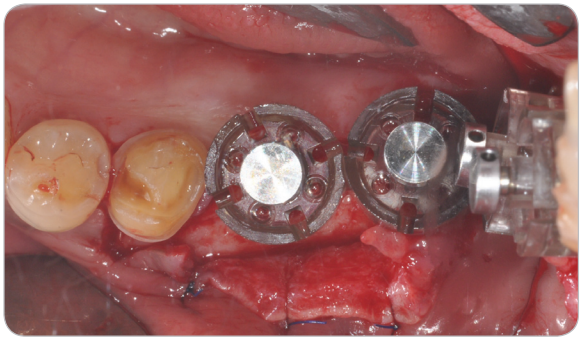
⑥ Surgical Kit Drilling

Extend the length to full length according to the protocol of the surgical kit that is used, expand the hole using a drill with a larger diameter, and then install the fixture.



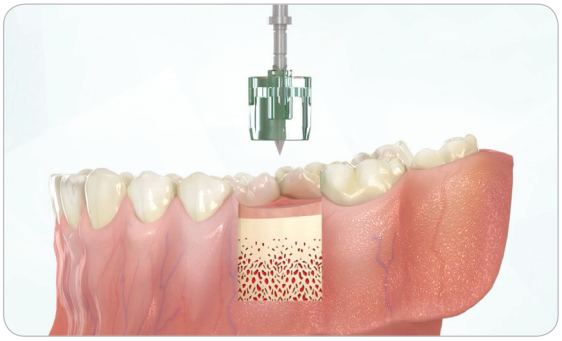
⑦ Path Verification

In a multiple case, insert the Guide Pole or Guide Pin in the drilled area, and by comparing with this, check the location and path of the next drilling.



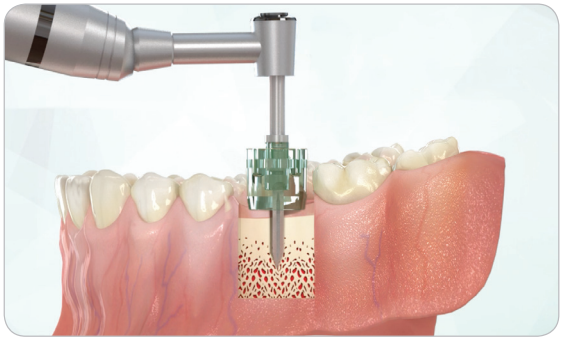
2. Tips for Using Guide Wheel in a Single Case

1



Connect the drill with the guide wheel according to the treatment plan

2



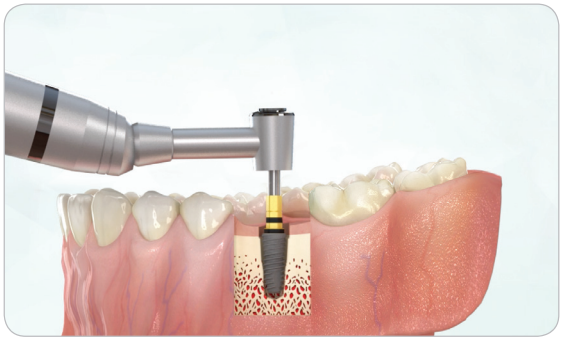
Initial drilling using the Guide Wheel drill that is located in the operation area

3



Drilling according to the drilling sequence of the implant system that is used

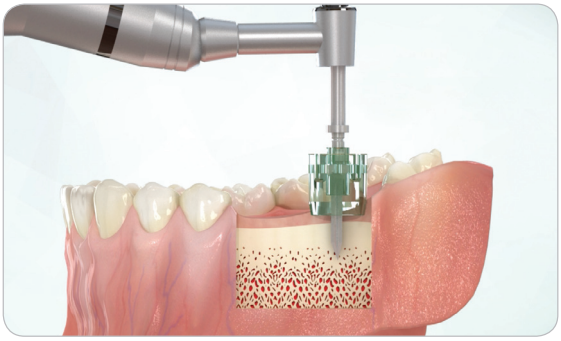
4



Fixture placement

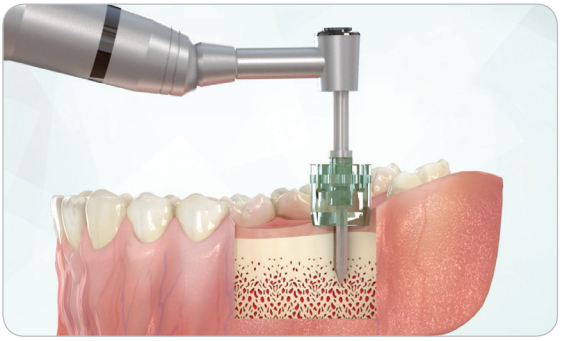
3. Tips for Using Guide Wheel in Multiple Cases

1



Connect the drill with the guide wheel according to the treatment plan

2



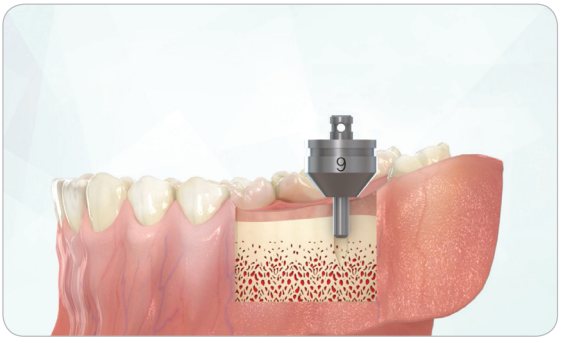
Initial drilling using the Guide Wheel drill that is located in the operation area

3



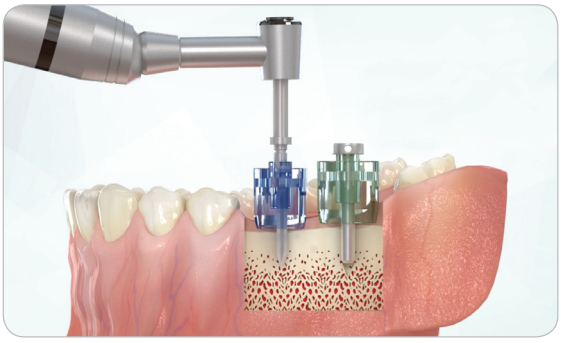
Insert the Guide Pole to the hole after final drilling to determine the virtual location

4



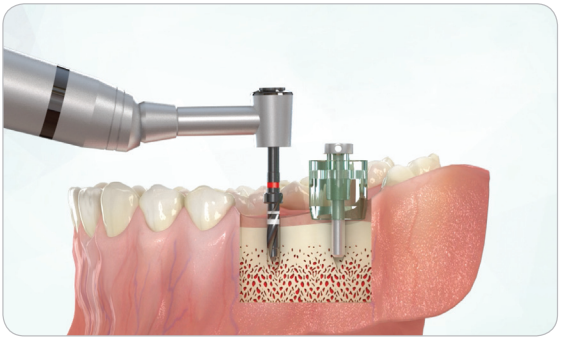
Or insert the guide pin

5



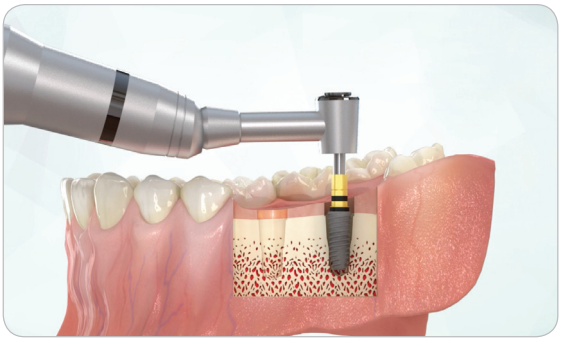
Initial drilling at the next operation area after connecting the drill and suitable Guide Wheel

6



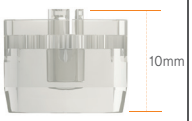
Drilling according to the drilling sequence of the implant system that is used

7



Fixture placement

4. Recommended Sizes According to Fixture Sizes in Guide Wheel

Fixture Diameter	Φ≤3	3<Φ<4	3.5<Φ<4.5	4<Φ<5	Φ≥4.5	Φ>5.5
Guide Wheel Diameter	 Ø6	 Ø7	 Ø8	 Ø9	 Ø10	 Ø12

- As the fixture diameter increases, a larger Guide Wheel should be used to secure the safety margin.
- If one wishes to install the fixture closer to adjacent fixture or teeth, choose a Guide Wheel with a smaller diameter.
- When sufficient space is needed, choose a Guide Wheel with a larger diameter.

5. Q&A

Q1. Isn't it difficult to use on a tilted surface? Can an ideal path be secured if the Guide Wheel is used?

A1.The Guide Wheel is developed to find the path even on uneven and tilted surfaces. It is easy to find the path without the Guide Wheel on flat surfaces. However, it is difficult to find the path on most tilted surfaces, and therefore the Guide Wheel is developed to find the path easier on such surfaces.

Q2. Is it disposable? Is it sterilized?

A2. Guide Wheel is sterilized and it is a disposable product.

Q3. Isn't it difficult to use in a multiple case?

A3. It can easily be used when used with Guide Pole or Guide Pin.

Q4. The initial drill is 2.0. Doesn't the path change in the next drill?

A4. After drilling with the Guide Wheel and determining the initial path using Guide Pin or Guide pole, the clinician needs to secure this path until full length drilling. Securing the initial path is not difficult when the density difference of the underlying alveolar bone is minimal. How ever, if the underlying alveolar bone density is irregular or deeper drilling is interrupted by adjacent teeth or structures, the initial drill path may not be secured. The clinician needs to try to secure the initial path determined by the Guide Wheel as he/she continues drilling. Such situations especially occur often in maxillary and mandibular molar area when teeth are extracted not long ago and drilling is interrupted by interseptal bone. In areas where bone is more dense, Lindemann drill or SAVE kit will be helpful.





IV

Clinical Cases

- Case Ⅰ. Clinical implementation of Guide Wheel on maxillary posterior area
- Case Ⅱ. Clinical implementation of Guide Wheel on mandibular posterior area
- Case Ⅲ. Clinical implementation of Guide Wheel on maxillary and mandibular posterior area
- Case Ⅳ. Clinical implementation of Guide Wheel on both mandibular second molar area
- Case Ⅴ. 1 day surgery of multiple fixture on maxillary posterior area and single fixture on narrow space
- Case Ⅵ. Re-implant installation using Guide Wheel

GUIDE WHEEL

Case I

Clinical implementation of Guide Wheel on maxillary posterior area

Patient Information

Location	7	**Sex / Age**	Female/46
C.C.	Tooth loss due to localized periodontitis		
Materials	Guide Wheel	10mm, Black	
	Fixture	5.2 X10 mm	
	Prosthesis	PFM Crown, SRCP type	

Procedure

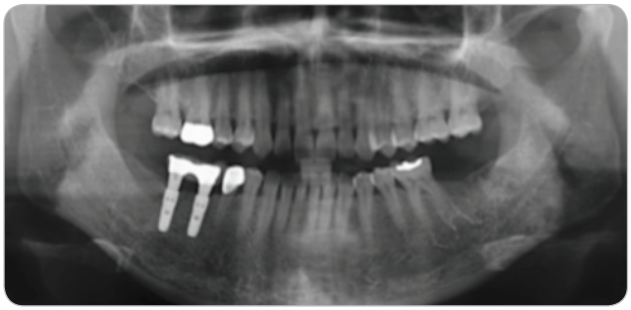


Fig.1 Pre-operative panoramic radiography



Fig.2 Pre-operative view of the surgical site



Fig.3 Flap elevation

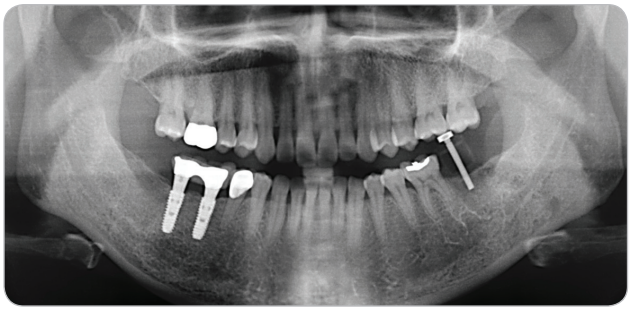


Fig.4 Insertion path confirmed by Guide Wheel and Pole



Fig.5 Drilling with Guide Wheel



Fig.6 Implant fixture installation





Fig.7 Healing abutment connection and suturing



Fig.8 Post-operative panoramic view



Fig.9 Three months post-operative



Fig.10 Removal of healing abutment





Fig.11 Connection of abutment





Fig.12 Delivery of the final prosthesis

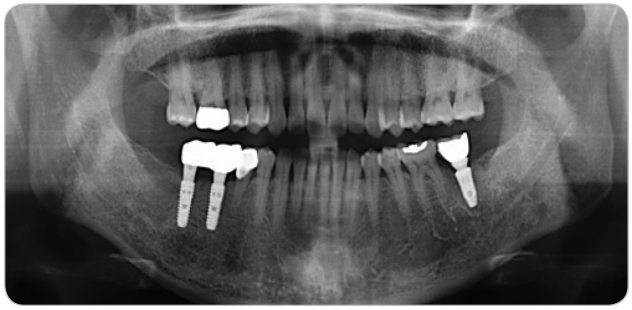


Fig.13 Panoramic radiography after delivery of the final prosthesis

Conclusion

The lower left second molar was extracted 10 months before an implant surgery. In a treatment plan, the angle and the length of distal roots of adjacent teeth should be carefully regarded. If an initial drilling point is set too closely to adjacent teeth, drills could touch or scratch the roots, bringing dangerous consequences. So, deciding the location and the angle of a fixture is the most considerable part. However, in this case, the location and the angle would not be considered as the distal root of lower left first molar seems to be parallel with its adjacent teeth. When the initial drilling point is determined, a panoramic view of Guide wheel and Pole together would be useful. In a panoramic view, Guide Wheel would be seen as blurred white square as fig 4.

Case II

Clinical implementation of Guide Wheel on mandibular posterior area

Patient Information

Location	6	**Sex / Age**	Male/65
C.C.	Tooth loss due to dental caries and abscess		
Materials	Guide Wheel	10mm, Black	
	Fixture	5.0 X10 mm	
	Prosthesis	PFM Crown, SRCP type	

Procedure

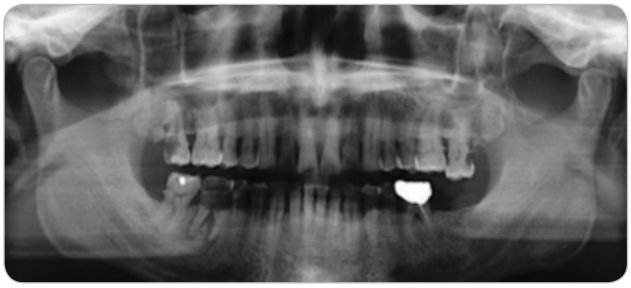


Fig.1 Pre-extraction panoramic radiography

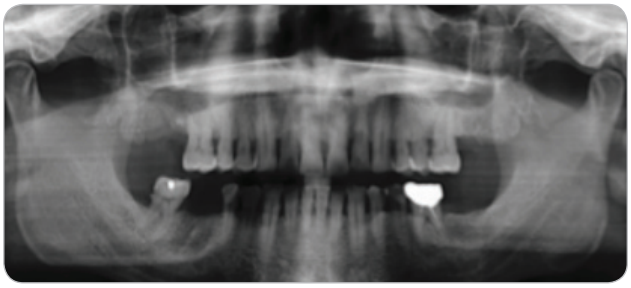


Fig.2 Pre-operative panoramic radiography (9months after extraction)



Fig.3 Pre-operative view of the surgical site



Fig.4 Drilling with Guide Wheel







Fig.5 Implant fixture installation



Fig.6 Healing abutment connection and suturing

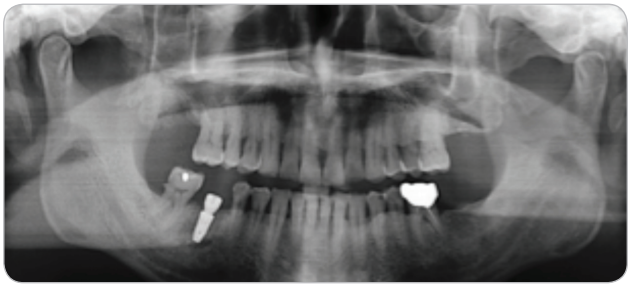


Fig.7 Post-operative panoramic view



Fig.8 Removal of healing abutment after 7 months



Fig.9 Connection of abutment







Fig.10 Delivery of the final prosthesis

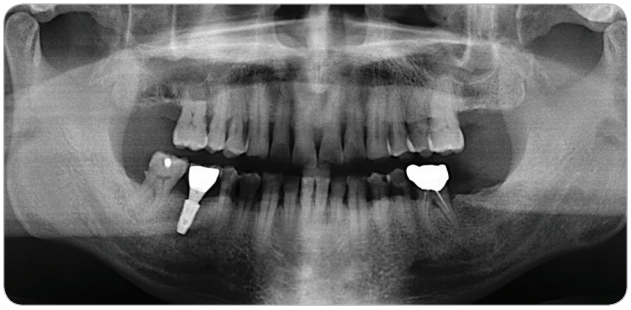


Fig.11 Panoramic radiography after delivery of the final prosthesis

Conclusion

The patient has no systemic disease. He has brachy face type and, hypertrophic masseter muscles and dense bone on the mandibular molar area. The upper right second molar, upper left second molar and lower left first molar have dental caries. But as and lower left first molar has the deepest caries and periapical abscess of all, it was planned to be extracted and implanted. There was an implant surgery 9 months after the extraction. A SAVE kit was used to maintain the original path by Guide Wheel as the interseptal bone between mesial and distal bone were close. No GBR procedure was added after the fixture insertion. After 3 months, a prosthetic procedure was proceeded and SRCP type PFM crown was connected. Due to loss of upper right second molar, lower right second molar may be extruded. The patient said that food impingement could happen between lower right first molar and lower right second molar.

Case III

Clinical implementation of Guide Wheel on maxillary and mandibular posterior area

Patient Information

Location	7 / 6	**Sex / Age**	Female/48
C.C.	Tooth loss due to crack tooth syndrome (#17), periapical abscess (#46)		
Materials	Tooth No.	#17	#46
	Guide Wheel	10mm, Black	10mm, Black
	Fixture	5.2 X10 mm	5.2 X10 mm
	Prosthesis	SRCP type, PFM Crown	SRCP type, PFM Crown

Procedure

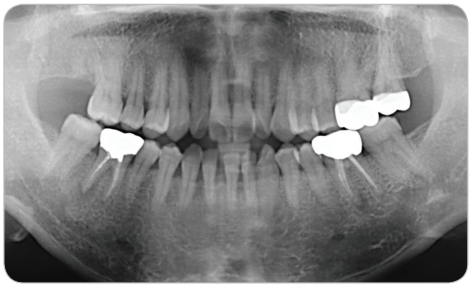


Fig.1 Pre-operative panoramic radiography

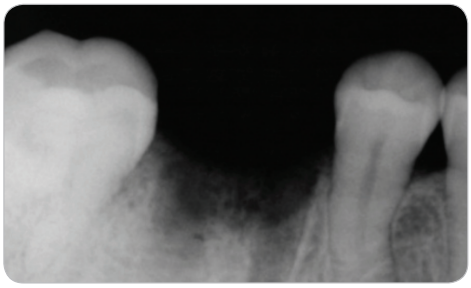


Fig.2 Periapical view after extraction of 46



Fig.3 Pre-operative view of 17area

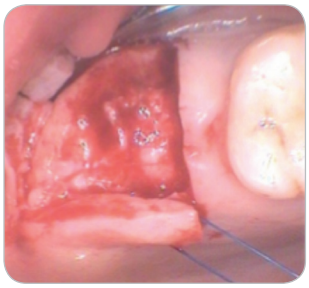


Fig.4 Flap elevation of 17area

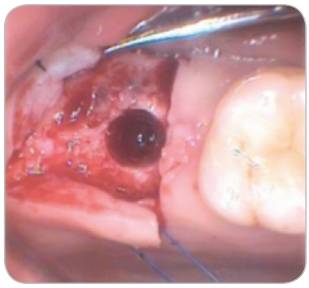


Fig.5 Drilling with Guide Wheel at 17 area



Fig.6 Implant fixture installation on 17

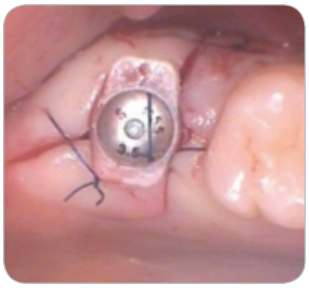


Fig.7 Connection of healing abutmentand Louis button

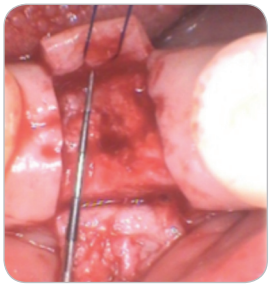


Fig.8 Flap elevation of 46 area

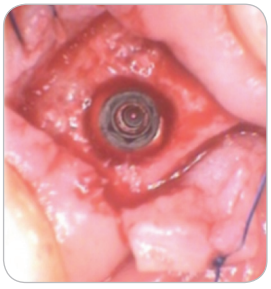


Fig.9 Implant fixture installation on 46



Fig.10 Healing abutment connection and suturing on 46

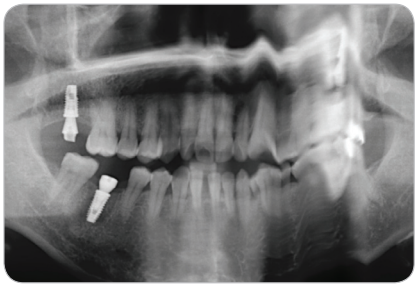


Fig.11 Post-operative panoramic radiography

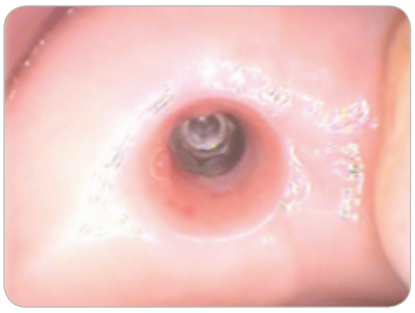


Fig.12 Removal of healing abutment of 17 after 3 months



Fig.13 Connection of customized abutment on 17

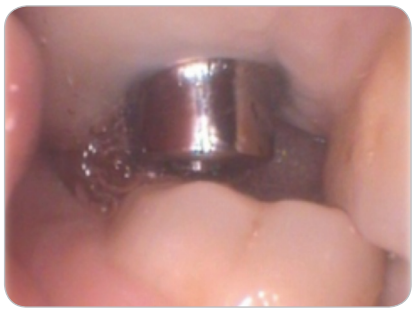






Fig.14 Delivery of the final prosthesison 17

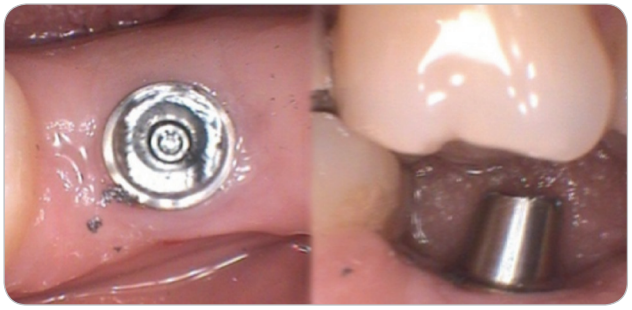


Fig.15 Connection of abutment on 46

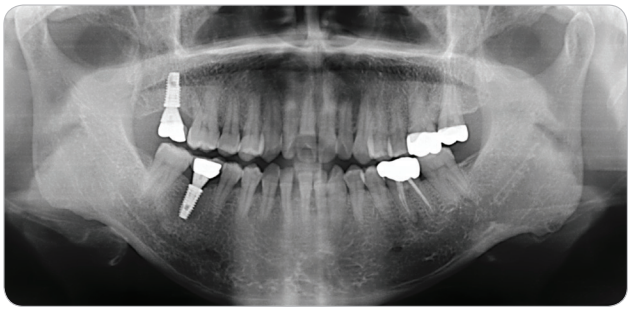


Fig.16 Panoramic radiography after delivery of the final prosthesis

Conclusion

Upper right second molar was lost about 5 years ago and the teeth on the left side are used only when chewing food. The patient is in extreme pain when she bites with lower right first molar. When a gold crown on lower right first molarwas removed, carious lesion was found on the root and the tooth was extracted. Firstly, an implant surgery on the upper right second molarwas proceeded and black Guide Wheel was used to set an initial drilling point. Black Guide Wheel is useful especially for areas where clinicians cannot see well. Four months after the extraction, implant surgery was proceeded on lower right first molar. The dense interseptal bone between mesial and distal roots were untouched. But the initial drilling point and the fixture path were set right using Guide Wheel and SAVE kit.

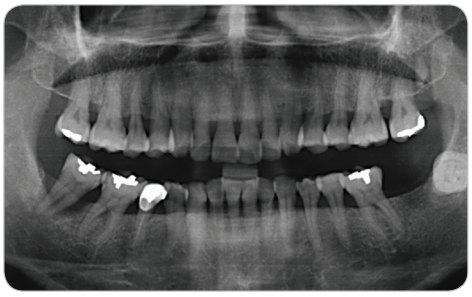
Case IV

Clinical implementation of Guide Wheel on both mandibular second molar area

Patient Information

Location	7 7	**Sex / Age**	Female/62
C.C.	Tooth loss due to crack tooth syndrome (#17), periapical abscess (#46)		
Materials	Tooth No.	#37	#47
	Guide Wheel	10mm, Black	10mm, Black
	Fixture	5.0 X10 mm	4.7 X10 mm
	Prosthesis	SRCP type, PFM Crown	SRCP type, PFM Crown

Procedure


Fig.1 Pre-extraction panoramic radiography

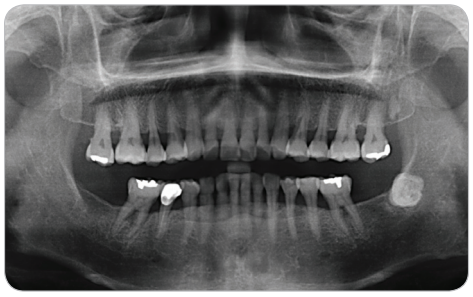
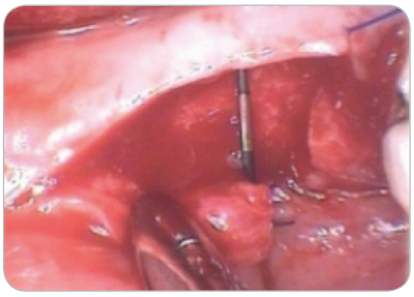
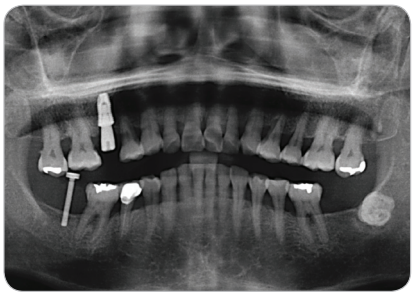
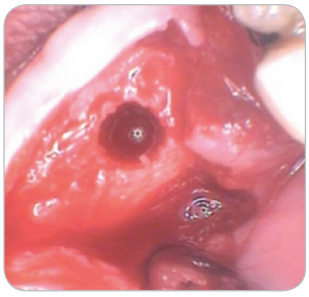

Fig.2 Pre-operative panoramic radiography


Fig.3 Pre-operative view of 47 area


Fig.4 Pre-operative view of 37 area


Fig.5 Flap elevation of 47area


Fig.6 Panoramic radiography with Guide Pin on 47


Fig.7 Drilling with Guide Wheel at 47 area

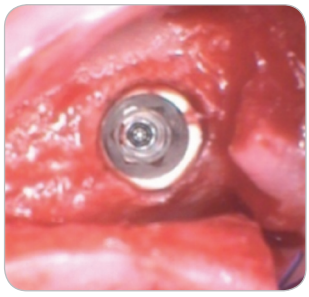
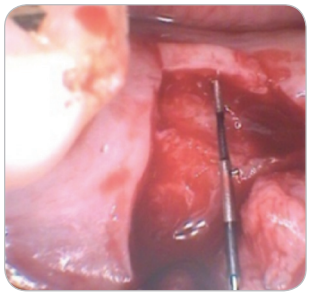

Fig.8 Implant fixture installation on 47


Fig.9 Connection of healing abutment on 47


Fig.10 Flap elevation of 37 area

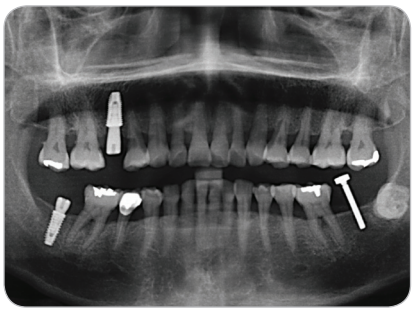


Fig.11 Removal of healing abutment of 17 after 3 months

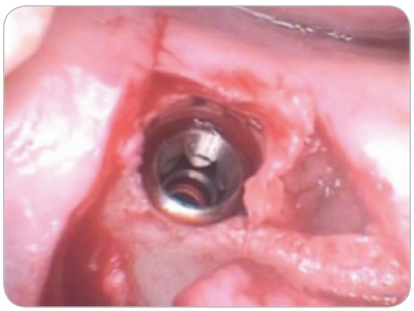


Fig.12 Implant fixture installation on 37

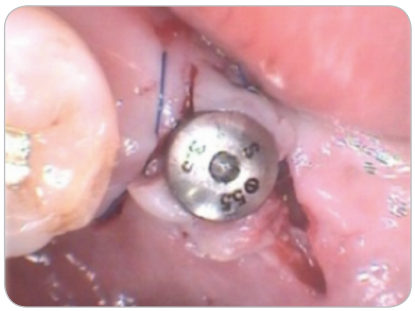


Fig.13 Healing abutment connection and suturing on 37

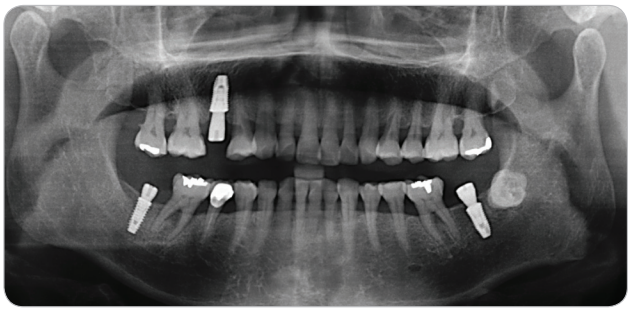


Fig.14 Post-operative panoramic radiography

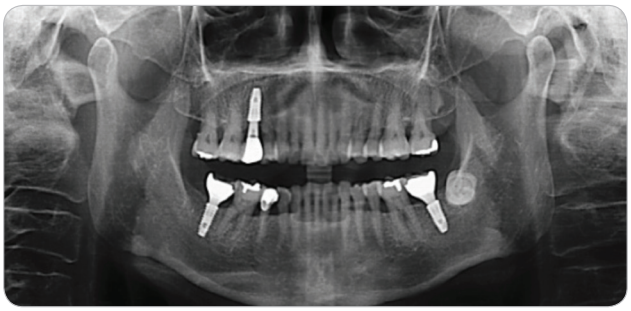


Fig.15 Panoramic radiography after delivery of the final prosthesissis





Fig.16 Delivery of the final prosthesison 47





Fig.17 Delivery of the final prosthesison 37

Conclusion

One maxillary premolar and two mandibular second molars were implanted. When the second molar is planned to be replaced, the axis of the first molar and the distance from the first molar must be considered. In this case, the initial drilling point was guided by Guide Wheel. The distance from distal roots of the first molar is right and the path of the fixture correlates with the first molar.

Case V

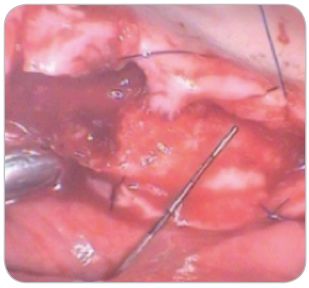
1 day surgery of multiple fixture on maxillary posterior area and single fixture on narrow space

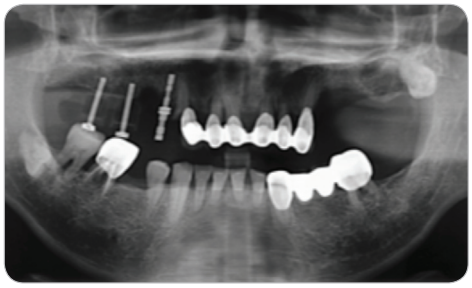
Patient Information

Location	7 6 4 / 5		**Sex / Age**	Male/53	
C.C.	Tooth loss due to localized periodontitis				
Materials	Tooth No.	#14	#16	#47	#45
	Guide Wheel	8mm, Blue	10mm, Black	8mm, Blue	7mm, Red
	Fixture	4.2 X10 mm	4.7 X10 mm	4.7 X10 mm	4.7 X10 mm
	Prosthesis	PFM Br SRCP, metal occlusion	PFM Br SRCP, metal occlusion	PFM Br SRCP, metal occlusion	PFM Cr SRCP, porcelain occlusion

Procedure


Fig.1 Pre-extraction panoramic radiography


Fig.2 Flap elevation on the upper right posterior area


Fig.3 Panoramic radiography with Guide Pin in position

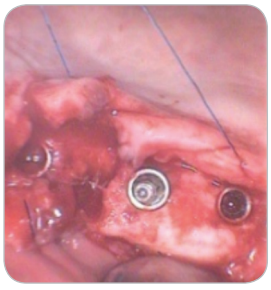

Fig.4 Implant fixture installation on 14, 16 and 17


Fig.5 Pre-operative view of 45area

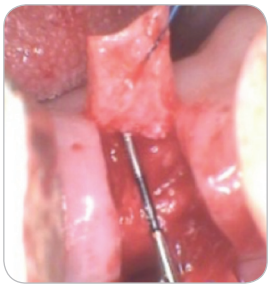

Fig.6 Flap elevation of 45 area


Fig.7 Panoramic radiography with Guide Pin on 45

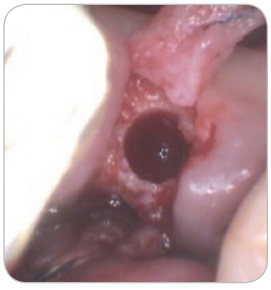

Fig.8 Drilling with Guide Wheel at 45 area


Fig.9 Implant fixture installation on 45


Fig.10 Healing abutment connection and suturing on 45


Fig.11 Post-operative panoramic radiography



Fig.12 Panoramic radiography after delivery of the final prosthesis



Fig.13 Delivery of the final prosthesis on 14, 16 and 17



Fig.14 Delivery of the final prosthesis on 45



Fig.15 Post-operative view of the surgical site after final prosthesis

Conclusion

The patient had diabetes and received treatments. A lot of teeth were lost for a long time. But due to financial difficulties, all teeth were not replaced. The patient wanted to replace only teeth on the right side this time. But because he had no alveolar bone on the left maxillary area, teeth were not replaced as he wished. On the right maxillary posterior area, the alveolar bone was destroyed especially on the second premolar area. 1-day surgery was scheduled to extract upper right second premolar and implant upper right first premolar, upper right first molar,upper right second molar and lower right second premolar. As the patient had periodontitis on upper right second premolar, implant on upper right second premolar was excluded. So total 4-unit PFM bridge with 3 implants were proceeded on the maxillary posterior area. On the right mandibular area, lower right second premolarwas extracted a long time ago. The space between lower right first premolarand lower right firstmolarwas narrow, therefore 7mm red Guide Wheel was used. Both sinus floor elevationand GBR was not proceeded.The patient was satisfied with this result, and he said that he would also replace teeth on the left maxillary posterior area.

Case VI

Re-implant installation using Guide Wheel

Patient Information

Location	7	**Sex / Age**	Female/58
C.C.	Tooth loss due to periodontitis		
Materials	Guide Wheel	10mm, Black	
	Fixture	4.7 X10 mm	
	Prosthesis	PFM Crown, SRCP type	

Procedure

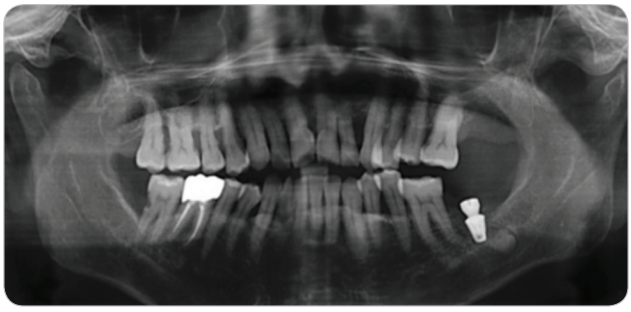


Fig.1 Pre-operative panoramic radiography

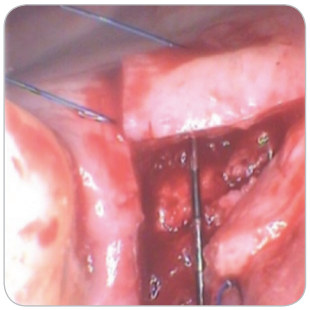


Fig.2 Flap elevation



Fig.3 Drilling without Guide Wheel

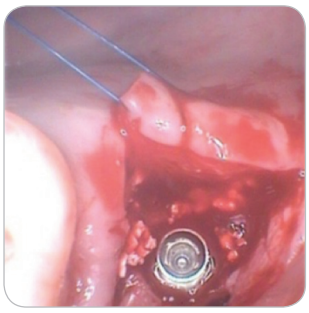


Fig.4 6.0x8mmimplant fixture installation



Fig.5 Healing abutment connection and suturing

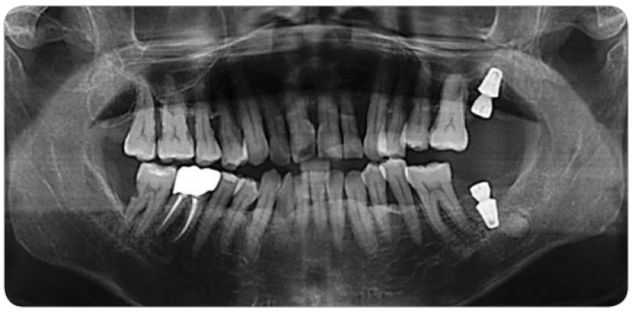


Fig.6 Post-operative panoramic radiography

Because of poor axis, the fixture was removed and covered with membrane(Lyoplant) after 8 days. Fixture installation with Guide Wheel was proceeded after 4 months.



Fig.7 Flap elevation

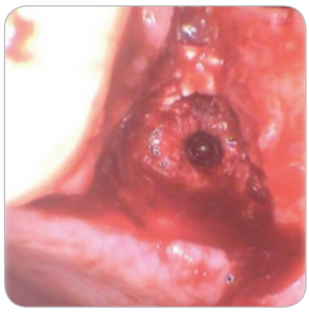


Fig.8 Drilling with Guide Wheel



Fig.9 Implant fixture installation

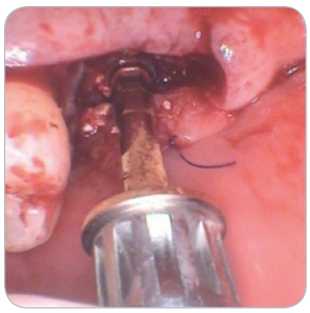


Fig.10 Confirm axis using a driver



Fig.11 Healing abutment connection and suturing

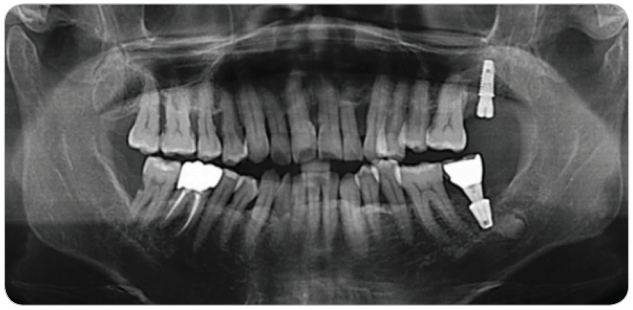


Fig.12 Post-operative panoramic radiography



Fig.13 6 months after implant installation



Fig.14 Connection of abutment



Fig.15 Delivery of the final prosthesis

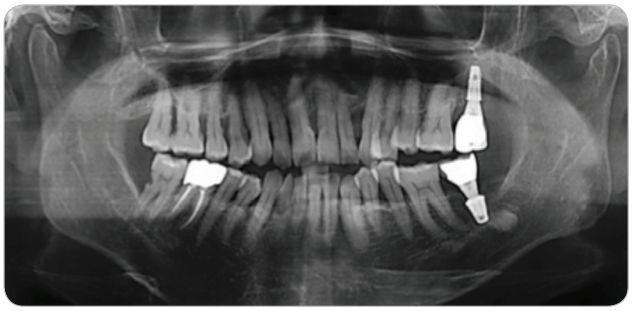


Fig.16 Panoramic radiography after delivery of the final prosthesis

Conclusion

This patient suffered from unstable occlusion on the left side. Only upper left first premolar and lower right lateral insicor were used when she masticates. The upper right second molar and lower left second molar were absent; upper right canine, upper right second premolar, upper right first molar and lower left canine, lower left second premolar, lower left first molar didn't touch each other at maximum intercuspitation. There was little bone beneath the lower maxillary sinus floor. Because clinicians cannot see all the teeth very well, a panoramic view was used after the first surgery, and the fixture was removed after 8 days. The second surgery was proceeded after 4 months. The axis of the fixture was set right with Guide Wheel. Sinus floor elevation using the crestal approach was proceeded at the same time. The conventional prosthetic procedure was proceeded.

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D-C-GWMB-201702-ENG