



# 第一階與第二階一起做的 單診植牙手術

應用〔BioHPP 支柱 + Sky 植體〕於前牙美觀區的植體立即負載  
[BioHPP abutment + Sky implant] in aesthetic area by one time therapy  
by Dr. Tien-Kuan Chen

文◎ 陳殿冠 醫師

- 高雄醫學大學牙醫系畢業
- 台中市羅馬牙醫診所負責醫師
- 台中市牙醫師公會出版委員會委員

## 本病歷提要 Abstract

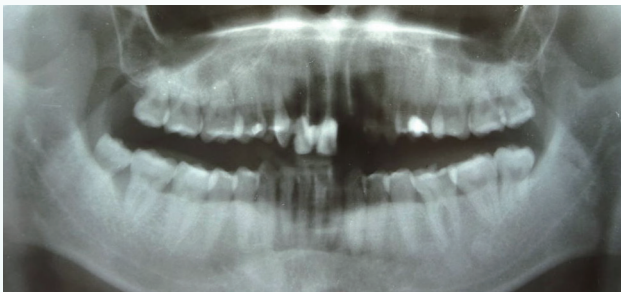
植體植入牙床暨復體完成後，常發生軟組織與硬組織的持續萎縮，而影響到美觀度，這在前牙區尤其明顯。本病例以應用 PEEK（常應用於膝關節、椎間盤）強化後的生物相容暨高表現性聚合體 BioHPP（Bio-compatible High Performance Polymer）作為植體用支柱，並應用於植牙手術當下，可立即測得初植穩定度數值的 Sky/Bredent 植體之上，單診完成上述所有治療，以降低軟、硬組織萎縮程度並達成美觀結果。亦即，這是一個基於 BioHPP 支柱的耐震以分散咬合力的特性，來執行以一次門診手術即完成植體第一階暨第二階手術；此後再無其他手術進行。在裝置永久牙冠之後，再追蹤近一年，可見到硬組織與軟組織皆有理想的表現，而於初診當日顯已萎縮殆盡的齒間乳頭則重新豐厚的長出，並完全遮蔽了剛裝置永久牙冠時的齒間黑色三角空間。

Based on the characters of bio-compatibility, force-absorption, whitish appearance, BioHPP abutment is applied in combined level-I/implant-installation & level-II/BioHPP-abutment-installation surgeries as an one-time-therapy ended up with a provisional crown altogether done in just one surgery/ appointment for restoration of a missing tooth in front aesthetic area in this case report. After 9 months, the Zirconium/permanent crown is installed/delivered and there is no further soft/hard tissue-graft or any kind of surgery proceeded beside the above-mentioned. After nearly one more year on the follow-up appointment, the long-gone interdental papillae beside the implant/crown grow back well in both mesial & distal proximal areas, and the black triangles obviously seen on the permanent-crown-delivery-day have no longer existed anymore.

**治療前的患者主訴與診斷 Chief complaint & diagnosis of the patient before treatment**

二十八歲男性，#21 牙冠斷裂已半年，詢問植體贖復的可行性。無全身性的病史，#21 兩鄰接面齒間乳頭已喪失。( Fig 01 & Fig 02)

28-yr male, suffering from crown broken of #21 and asking for the possibility of implant rehabilitation, no systemic disease, no interdental papillae both proximal. (Fig 01 & Fig 02)



■ Fig 02.#21 crown broken 牙冠斷裂。



■ Fig 01.#21 crown broken for 6 months, no interdental papillae both proximal. 牙冠斷裂已半年，#21 兩鄰接面的齒間乳頭都已喪失。

**治療計畫 Treatment plan**

於一次性的手術門診中，在拔除 #21 殘根後，立即合併執行第一階手術—植體植入，與第二階手術—接上植體用支柱，並於支柱上立即裝置暫用性的牙冠。採用 3.5/16 mm narrow Blue-SKY/Bredent 植體和 BioHPP/Bredent 支柱。

of the residual root of #21, the level-I surgery by implant installation, the level-II surgery by abutment installation, and provisional crown installation immediate altogether, with implant 3.5/16 mm narrow Blue-SKY/Bredent and BioHPP abutment 15° in small size Bredent.

In one time appointment, doing extraction

**手術過程與手術設計 Procedure and design of the surgery**

**Oct-12-2019 第一階手術+第二階手術+暫用性牙冠**  
**Level I + Level II surgeries + provisional crown**

1. 拔除 #21 殘根。

Extraction of #21 (Fig 03 & Fig 04)



■ Fig 03.surgery ready before extraction of the root of #21 when in Oct-12-2019. 手術準備開始，於 #21 殘根拔除前，手術日 /Oct-12-2019。



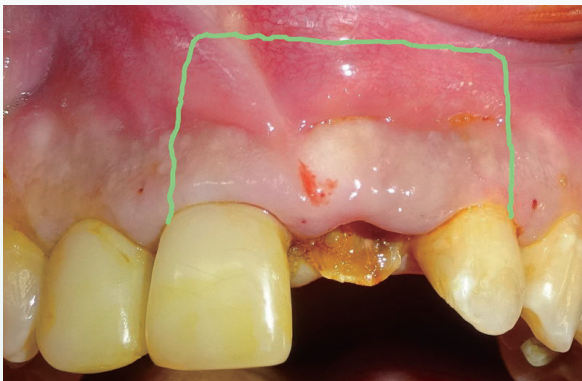
■ Fig 04.after extraction of the root of #21。

2019/10/12



2. 以牙齦分離器將 #21 處的唇側牙齦與齒槽骨撥分開，而做一個如同口袋狀的空間，範圍擴至兩鄰接牙的遠心端，如同 Fig 05 所示的設計範圍。

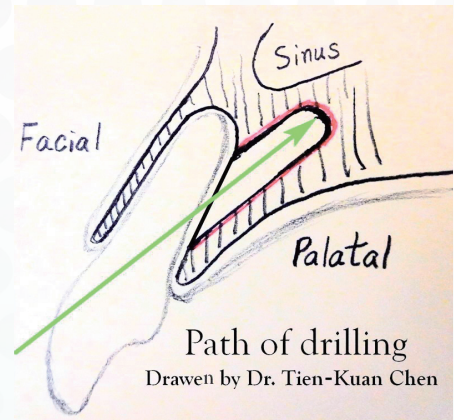
To design a pouch beneath facial gingiva and upon bone of #21 and extend to distal proximal areas of adjacent teeth, #11 & #22 as Fig-05 by utilizing a gingival separator.



■ Fig 05. design for a pouch beneath gingiva for insertion of a piece of collagen membrane. 唇側面牙齦下的口袋設計範圍，要用來填入膠原蛋白再生膜。

3. 植體植入的路徑，並非從原來 #21 的牙根尖所在的齒槽骨往下鑽入，而是在該齒槽底端偏顎側的斜坡上，另鑽一個很接近原牙根尖處的開口，然後以想像盡量平行但實際會略偏顎側的角度，鑽出一個新的植體植入的路徑，這一路徑會與原 #21 拔除路徑，呈現略偏顎側的角度，如同 Fig 06 所示。

The designed path of drilling for the implant is not directly through the apex spot of #21, but done palatally and slightly angularly on the palatal hill with a new drilling orifice quite near the apex spot. (Fig 06)



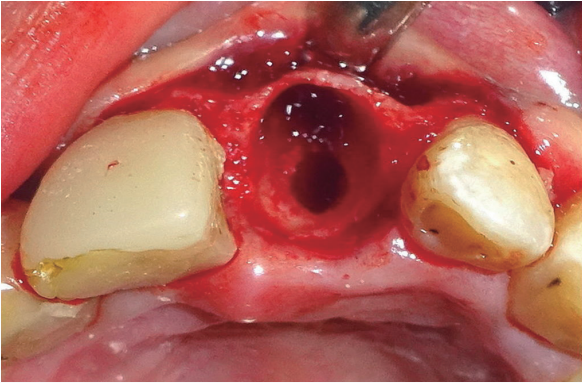
■ Fig 06. path of drilling, done palatally and slightly angularly. 植體植入路徑，略偏顎側。

4. 依著 Fig 06 所示的設計，完成最後的 3.5/16mm 植體植入路徑，可目視到在 #21 齒槽處有兩孔，靠唇側的孔是原 #21 根尖的所在處，而靠顎側的孔即是新鑽出的植體植入路徑 (Fig 07-1 & Fig 07-2)。

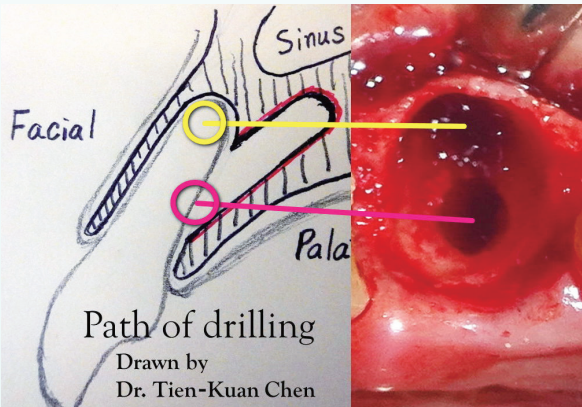
After being done as what is designed as Fig 06, the scene shows two holes at the socket of #21. The facial hole is the original residual root position, and the palatal hole is a new drilled hole for the implant-3.5/16mm. (Fig 07-1 & Fig 07-2)

5. 將 3.5/16mm narrow Blue SKY-Bredent 的植體 (Fig 08) 植入靠顎側的孔 (如 Fig 07-2 所示的紅色入口)，直至植體上緣平台與唇側骨壁的頂端邊緣齊平 (iso-crestal)，而植入完成時的扭力達 40 牛頓釐米 (Fig 09)。目視可見，植體與唇側骨之間留有寬約 3.5 mm 的空間。(Fig 10)

Implant-3.5/16mm narrow Blue SKY-Bredent is installed iso-crestally to the facial margin of the bone wall by torch on 40 Nt-cm, meanwhile shaping a space in width of



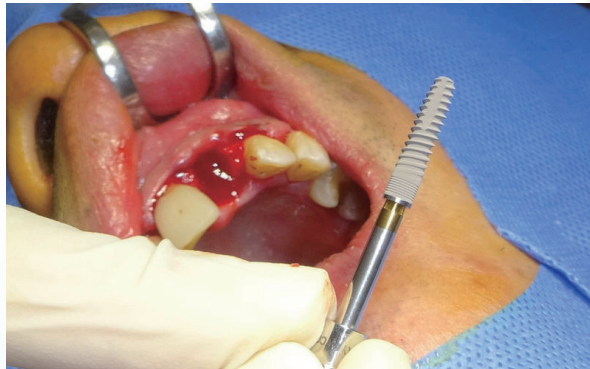
■ Fig 07-1. At #21 site, the facial hole is the original residual root position, and the palatal hole is a new drilled hole for an implant. 在 #21 位置靠唇側的孔是原來的牙根尖處，而靠顎側的孔則是新鑽的植體植入路徑。



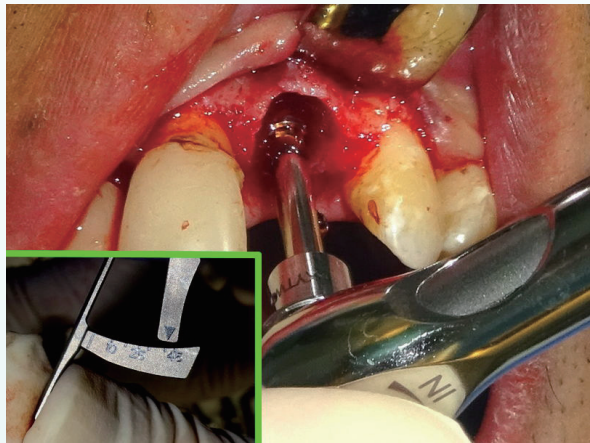
■ Fig 07-2. At #21 site as the designed sketch of Fig 06, the yellow spot is the original residual root position, and the red spot is a new drilled hole for an implant. 依照 Fig 06 的設計所鑽出一條新的植體植入路徑入口位在偏顎側的紅色圈圈處，而偏唇側的黃色圈圈處則是原來 #21 的牙根尖處。

approximately 3.5 mm between the implant and the inner surface of the facial bone wall. (Fig 10)

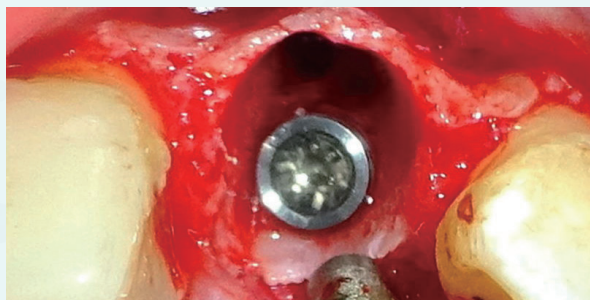
- 測得植體穩定度商數 (Implant Stability Quotient, ISQ) 數值為 67，而一般認為數值若在 55 以上即可做立即負載。(Fig 11)  
Checking the primary stability to get ISQ/67 (above 55) considered OK for immediate restoration. (Fig 11)



■ Fig 08. Implant-3.5/16 mm narrow Blue SKY-Bredent (narrow for anterior aesthetic area). 德國 SKY-Bredent 窄版植體 (前牙美觀區專用)。



■ Fig 09. implant height iso-crestal to facial margin of bone, by torch on 40 Nt-cm. 植體植入直至其頂端平台與唇側骨壁頂端齊平，扭力達 40 Nt-cm。



■ Fig 10. implant position check, with a space width facial by approximately 3.5 mm. 植體植入後與唇側骨壁約有 3.5 mm 寬度的空間。



7. 確定可立即負載後，接著做第二階手術。  
 BioHPP 支柱有 0° 與 15° 兩種角度 (Fig 12)，而為了補償如 Fig 06 所造成的角度偏差，於是選擇 15° /small (Bredent/Germany) 以最恰當的角度 (內六枚花瓣套接，在六個置入角度中挑選最佳者) 置入植體中，在目視確認 BioHPP 支柱與兩鄰接牙齒形成一個和諧的排列後 (Fig 13, Fig 14-1)，就將隨附內建的螺絲鎖上扭力至 25 Nt-cm (Fig 14-2)。  
 Choosing BioHPP abutment in 15° /small (Bredent/Germany) instead of 0° (Fig 12) to compensate the angular bias of the drilled

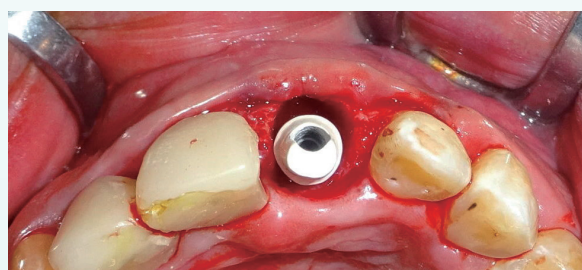
path to an harmonic curved 3-D alignment with adjacent teeth (Fig 12, Fig 13, Fig 14-1), and letting BioHPP-abutment be installed on torch by 25 Nt-cm with the implant. (Fig 14-2)



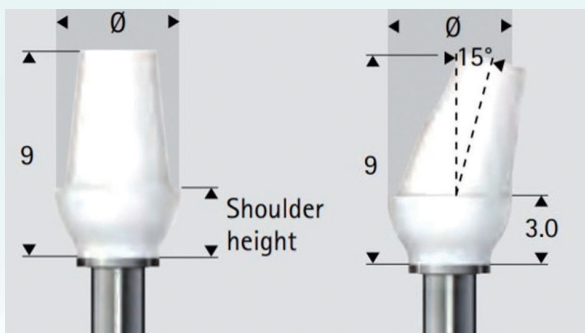
■ Fig 11. ISQ check for primary stability, shown 67 (above 55) considered OK for immediate restoration. 植體的初級穩定度經由〔植體穩定度商數 ISQ〕的測量為 67 (高於 55) 而可應用於立即負載支柱及占用性牙冠。



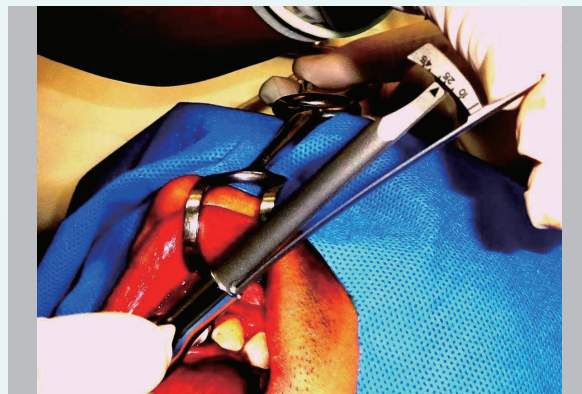
■ Fig 13. BioHPP abutment-15° /S installed immediately after implant installation at the same surgery appointment. 在同一門診手術中於植體植入後立即裝載 15° /S 的 BioHPP 支柱。



■ Fig 14-1. BioHPP abutment in 15° compensating the angular bias of the drilled path shown as Fig-06 to an harmonic curved 3-D alignment with adjacent teeth. 應用 15° 的 BioHPP 支柱來補償如 Fig 06 所示植體植入路徑所產生的角度偏差，以便與兩旁的鄰接牙齒排列成一個和諧的三維立體曲線。



■ Fig 12. BioHPP abutments, standard and 15° (photo by courtesy of the Bredent Co.) BioHPP 支柱有 0° (標準型) 與 15° 兩種角度 (承蒙德國 Bredent 原廠提供照片)。



■ Fig 14-2. BioHPP-abutment on torch by 25 Nt-cm. 為 BioHPP 支柱鎖上扭力達 25 Nt-cm。





8. 備妥適當裁切好（一個長方形連著一個圓形的剪紙狀態）的膠原蛋白再生膜，與骨再生移植充填物 Grafton/Medtronic（Fig-15），將再生膜依著 Fig 05 設計所撥出的口袋，將長方形的剪紙全部平行填入，而露出圓形的剪紙在口袋外，這個填入的再生膜是介於牙齦與唇側骨之間（Fig 16-2）；接著，把 Grafton 逐量填入植體與唇側骨的縫隙中，直至與唇側骨的頂端齊平為止（Fig 16-1, Fig 16-2），再把露出的圓形剪紙，中間打洞（也可在剪裁時就已打洞），然後蓋穿過整個 BioHPP 支柱，也將整個骨再生移植充填物封住（Fig 16-3），其剖面結構如 Fig 16-4 所示。

Putting well-cut collagen membrane (rectangle part) inside the designed pouch be-

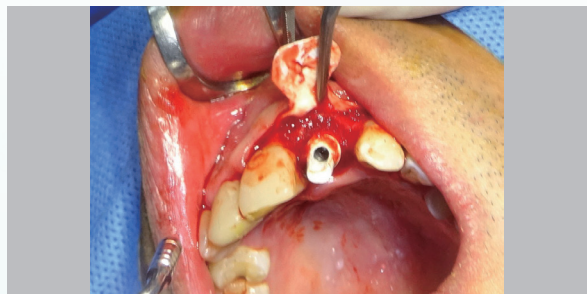


■ Fig 15. collagen membrane designedly cut (a rectangle extended with a circle), and GBR by Grafton-Medtronic. 備妥適當裁切好（一個長方形連著一個圓形的剪紙狀態）的膠原蛋白再生膜，與骨再生移植充填物 Grafton/Medtronic。

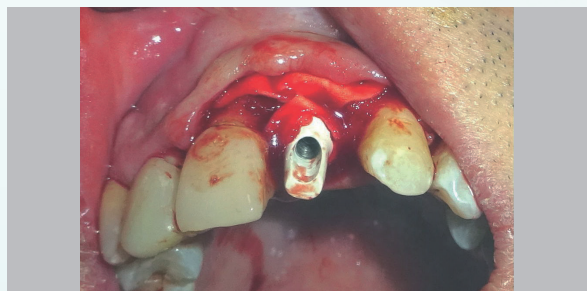


■ Fig 16-1. collagen membrane/rectangle-part put inside the designed pouch beneath gingiva as Fig 05, and GBR filled into the gap between facial bone wall and implant/abutment. 將膠原蛋白再生膜的長方形剪紙全部平行填入如 Fig 05 所示介於牙齦與唇側骨之間的口袋內，骨再生移植充填物則置入唇側骨壁與植體之間的空隙中。

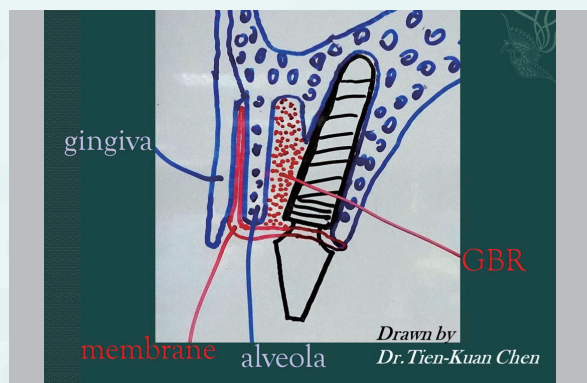
neath gingiva as Fig-05., and filling GBR iso-crestally into the gap between facial bone wall and implant-abutment, and covering collagen-membrane (circle part) on and let through the BioHPP-abutment (Fig-15, Fig 16-1, Fig 16-2, Fig 16-3), which are designed as the sketch of Fig 16-4.



■ Fig 16-2. collagen membrane and GBR both in position. 膠原蛋白再生膜與骨再生移植充填物皆充填好植充填物則置入唇側骨壁與植體之間的空隙中。



■ Fig 16-3. covering collagen-membrane/circle-part on and let through the abutment. 蓋上膠原蛋白再生膜圓形部分並讓支柱從中央穿出。



■ Fig 16-4. membrane put inside the designed pouch beneath gingiva as Fig 05. and extendedly covering on and letting through the abutment, and GBR filled into the gap between facial bone wall and implant-abutment. 再生膜置於如 Fig 05 所示的牙齦下，延展蓋過並讓支柱穿出，其下則是被覆蓋的骨再生移植充填物，充滿了整個唇側骨壁與植體之間的縫隙。

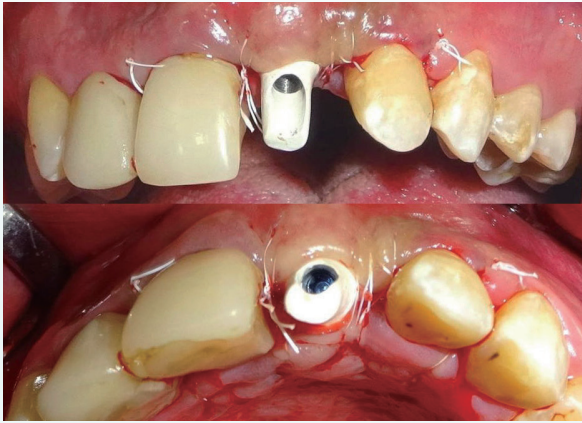




9. 以 PTFE 4/0 縫合傷口。

Sutures with PTFE 4/0.(Fig 17)

10. 裝上 PMMA 暫用性的牙冠。至此，從拔牙起，歷經第一階手術 / 植體植入、第二階手術 / BioHPP 支柱裝載入植體中並鎖上至永久負載扭力，以至於暫用性牙冠裝載完成，共歷時約九十分鐘，並以一次門診完成 (Fig 18)。



■ Fig 17. sutures with PTFE 4/0 縫合。

Installing a provisional crown (PMMA) on BioHPP-abutment immediately after suturing so implant-abutment-crown are all done in one time therapy which takes about 90 minutes altogether in one appointment. (Fig 18)



■ Fig 18. provisional crown installed immediately after suturing so implant-abutment-crown all done in one time therapy, taking about 90 minutes altogether in this case when on Oct-12-2019. 縫合後立刻裝上暫用性的牙冠，自拔牙起以歷植體支柱手術以至於裝上暫用性牙冠的合併單診治療至此完成，共歷約 90 分鐘，於手術日 / Oct-12-2019。

### July-14-2020 術後九個月回診為製換永久牙冠

#### Recalled for preparation of permanent crown after nine months since surgery-day

11. 經過上述手術門診九個月後，患者回診。患者的口腔衛生不佳，可見到牙菌斑在所有牙齒的齒頸部與牙齒鄰接面都到處堆積，但環繞著 BioHPP 支柱的牙齦卻生長飽滿，並向唇側面鼓起，顯示其下的硬組織有不錯的骨整合與支撐 (Fig 19)。  
After nine months from one-time-therapy-day, the patient is recalled with bad oral hygiene but good recovery of gingival and bony outlooks around BioHPP-abutment. (Fig 19)

12. 把 BioHPP 支柱當作天然牙，來車牙、排齦、印模，然後交付牙科技師，做出一顆氧化鋯的全瓷牙冠 (Fig 20-1, Fig 20-2, Fig 21)。

Doing permanent crown preparation, gingivord application, and impression for the BioHPP-abutment as a natural tooth then getting a Zirconium crown from the lab. (Fig 20-1, Fig 20-2, Fig 21)



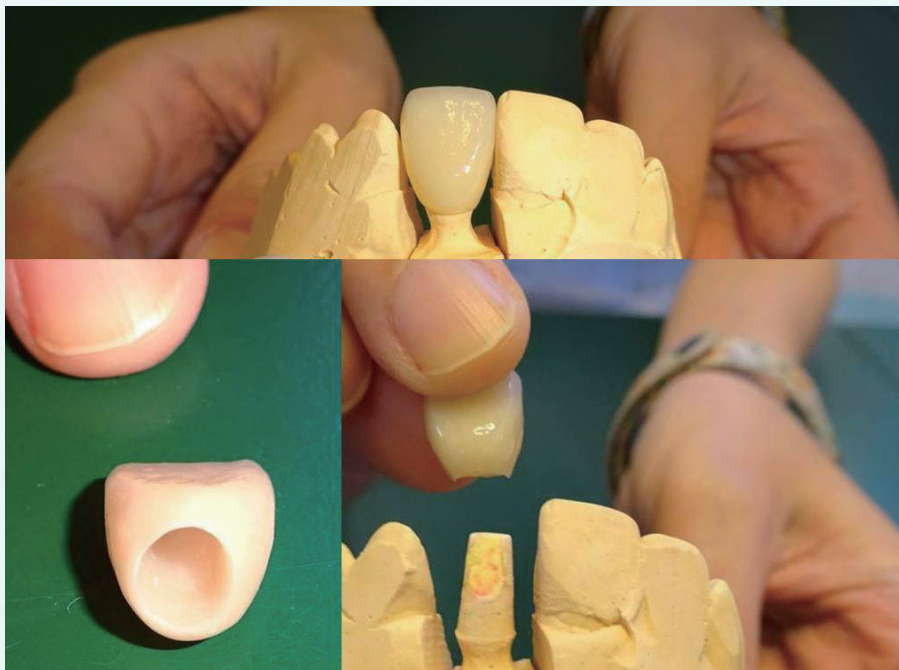
■ Fig 19. nine months recalled after one-time-therapy-day, bad oral hygiene but good recovery of gingival and bony outlooks around BioHPP-abutment when on Sep-14-2020. 患者於一二階合併單診手術治療之後 9 個月回診，口腔衛生狀況不佳，但 BioHPP 支柱周圍的牙齦與骨支撐外觀都很良好，回診日 /July-14-2020。



■ Fig 20-1. permanent crown preparation for the BioHPP-abutment as a natural tooth. 把 BioHPP 支柱當作天然牙來車牙以製備永久牙冠。



■ Fig 20-2. Gingicord applied on the prepared BioHPP-abutment for impression as the natural-tooth-way. 把 BioHPP 支柱當作天然牙來排齦印模。



■ Fig 21. Zirconium crown back from the lab as the traditional way. 如傳統方式在印模後送交技工所做一個全銜牙冠。



July-30-2020 永久牙冠完成交付

Delivery of the permanent crown

13. 這一天，是永久牙冠的完成交付日。在永久牙冠黏著於原 #21 位置的 BioHPP 支柱之前，已交代患者把口腔衛生狀況改善，此時可以從咬合面清楚看到，BioHPP 支柱與環繞的牙齦有緊密的結合，而牙齦溝邊緣飽滿，且支柱所在的唇側面牙齦隆起，顯現軟、硬組織在手術日的九個月後，都已呈現理想的預後 (Fig 22)。

After 9 months from one-time implant-abutment surgery day, good gingival and bony forms around BioHPP-abutment are shown just before permanent crown installation on delivery day when oral hygiene of the patient has been asked to be kept well. (Fig 22)



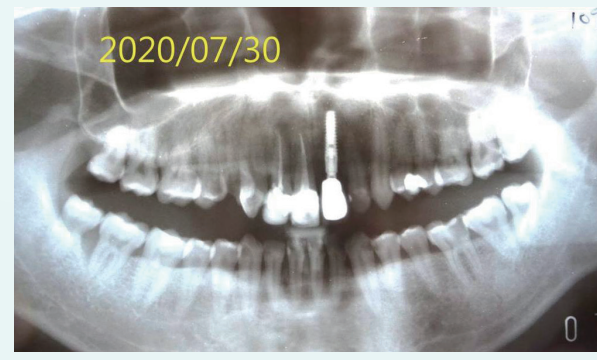
■ Fig 22. after 9 months from one-time implant-abutment surgery day, shown good gingival and bony forms around #21 just before permanent crown installation on delivery day when on Sep-30-2020. 在一二階合併單診手術治療之後 9 個月，即將黏著永久牙冠而完成交付，可見到 #21 周圍的軟硬組織都呈現飽滿健康的狀態。

14. 把全銼牙冠黏著於原 #21 位置的 BioHPP 支柱上，可見到該牙冠與兩鄰接牙齒之間，完全不見齒間乳頭，而留下兩個明顯的黑色三角空間 (Fig 23-1)，其 X 光影像則顯示並無任何異狀 (Fig 23-2)。

Zirconium crown installation on the BioHPP-abutment of #21 shows no interdental papillae but black triangles both at mesial and distal proximal areas (Fig 23-1). The X-ray shows nothing particular on this delivery day (Fig 23-2).



■ Fig 23-1. Zirconium crown installation of #21 on delivery day, shown black triangles both at mesial and distal proximal areas when on Sep-30-2020. 黏著永久牙冠而完成交付，可見到 #21 兩鄰接面呈現黑色三角空間，完成交付日 /July-30-2020。



■ Fig 23-2. X-ray film shows nothing particular on permanent crown delivery day, July-30-2020. 由 X 光片顯示並無異狀於完成交付日 /July-30-2020。



### May-06-2021 術後 18 個月後 / 永久牙冠黏著 9 個月後的回診追蹤

#### 18 months after-surgery / 9 months after-delivery follow-up

15. 在術後 18 個月，亦即永久全銦牙冠黏著交付後 9 個月，患者回診追蹤，顯現其口腔衛生狀況不佳，牙菌斑滿布於齒間並環繞於齒頸部，但 #21 兩鄰接面的齒間乳頭已飽滿的長出，並充滿了整個齒間縫隙，完全看不見 9 個月前那樣的黑色三角空間；而在 #21 的唇側牙脊面，可見到鼓起飽滿的狀態，與對稱的 #11 唇側牙脊面的天然飽滿狀態，無分軒輊（Fig 24-1）。值得一提的是，在 18 個月前的那一次「第一階植體植入加第二階裝上 BioHPP 支柱的合併單診手術」之後，就再也沒有進行過任何的軟、硬組織移植手術，而前述的單診手術也不曾使用過鈦網架或骨釘，來幫助牙脊與牙齦的成形，一切只是讓骨頭與牙齦自然的長成天然牙應有的型態（Fig 24-2）。

On the day for follow-up after 18 months since implant/BioHPP-abutment-surgery-



■ Fig 24-1. After nine months since the installation of the permanent crown, interdental papillae of #21 have fully grown and filled up the spaces both mesially & distally which shows no black triangles aside anymore even under low grade condition of oral hygiene when on May-06-2021. 在 #21 永久牙冠黏著交付之後再過了九個月，患者回診追蹤，口腔衛生狀況不佳，但 #21 兩鄰接面的齒間乳頭都飽滿的長出，並充滿了整個齒間縫隙，原來的黑色三角空間已不復見，回診追蹤日 / May-06-2021。

day which is after 9 months since permanent-Zr-crown-delivery-day, the interdental papillae of #21 have fully grown and filled up the spaces both mesially & distally which shows no black triangles aside anymore even the oral hygiene is not in good condition meanwhile. The facial ridge/gingiva of #21 is also in a plump shape which is the same as the symmetry natural tooth of #11. (Fig 24-1) It is worthy to be noticed that there has been no further surgery for any soft or hard tissue graft since the one-time-surgery 18 months ago when no titanium frame or pin applied. The plump natural outcome is achieved only by natural growth of the original gingiva and natural osseointegration on its own (Fig 24-2).



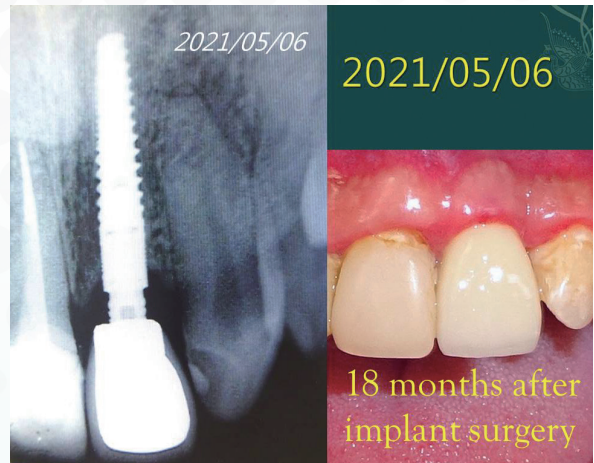
■ Fig 24-2. The nine month follow-up shows the interdental papillae of #21 automatically grow and fill up the black triangles without Ti-frame or further soft tissue graft. 在永久牙冠交付完成之後的九個月，回診追蹤發現 #21 兩鄰接面的齒間乳頭都自行飽滿的長出，再不復見原來的黑色三角空間，而這一切並未依賴鈦網架的固定或更進一步的任何軟組織的移植。





16. 從 X 光片可見到，在植體植入 18 個月後，植體周圍的齒槽骨長得很好，而且骨整合狀況也不錯，這都促成了 #21 的唇側牙脊面與牙齦可以呈現鼓起飽滿的自然狀態，而這一切似乎都不受到患者本人口腔衛生狀況長期不良的影響 (Fig 24-3)。

After 18 months from the implant-surgery-day, the X-ray film shows well grown alveolar bone around and good osseointegration of the implant and it explains why there is a plump natural outlook of the facial ridge/gingiva of #21. And all of these seem not to be affected by the long-term low-grade oral hygiene of the patient (Fig 24-3).



■ Fig 24-3. When on May-6-2021, X-ray film shows well bone growth surround the implant of #21 after implant-surgery-day for 18 months. 在經過植體植入手術的 18 個月之後，X 光影像顯示 #21 位置的植體周圍的骨頭已成長良好，回診追蹤日 / May-06-2021。

### 討論與結論 Discussion & Conclusion

1. 關於植體的相關手術，每多一次的切開軟組織讓齒槽骨曝露出來，就容易讓植體周圍齒槽骨的高度多一次的退縮，因此，本病歷報告以合併第一階、第二階手術，且不再另外進行其它診次的軟、硬組織移植手術，其目的便是盡量讓齒槽骨保持在穩定的軟組織覆蓋下，安穩地進行牙床豐隆度復原，與植體的骨整合。這樣的兩階手術合併單診治療，除了可讓患者不需要多診手術之苦外，也可讓患者在這唯一的一次手術當下，就可用所裝上的牙冠支柱，立刻套上暫用性的牙冠而恢復美觀，以度過所有的骨整合等待時期 (Fig 18)。

One-time-surgery-therapy spares more recession of the bone level surround the implant from the multiple surgeries by open-flap and

patient's more suffers in the clinic. It also provides the immediate prosthetic to keep patient's social life form being interrupted during waiting for osseointegration's being developed (Fig 18).

2. 植體若接出牙冠，因不具有天然牙的牙周韌帶所帶來的緩衝性，而常被認為會影響到骨整合，所以也就不立即接出支柱，以致無法立刻裝上暫用性的牙冠。聚醚醚酮 PEEK 應用於椎間盤或膝關節的醫療置換已歷四十年，其特性便是在於具有生物相容性之外，也兼具有一定的緩衝性，而生物相容高表現聚醚醚酮 BioHPP (Biocompatible High Performance Polymer) 是以前述 PEEK 再加上 30% 瓷填體 (ceramic fillers) 所製成



以符合口腔咬合負載的需要；於是 BioHPP 支柱所具有的緩衝性，可提供類比牙周韌帶的咬合力緩衝功能，在本病歷報告中，當 ISQ（植體穩定度商數）數植客觀呈現可立即負載後，便應用於兩階手術合併單診完成治療。

BioHPP(Biocompatible High Performance Polymer)is made from PEEK(well-known applied in intervertebral discs and hip joint prostheses for 40 years due to being compatible and force- absorbent properties)mixed with 30% ceramics, so the BioHPP abutment may play a buffer role like the periodontal ligament which absorbs the instant high peak of occlusal force to keep the tooth or implant itself from being damaged by concussion. The one-time-therapy of this report is therefore done by the force-absorbent character of the BioHPP abutment and the objective ISQ-value/primary-stability of the implant.

- 除了 在 #21 的唇側牙脊面，以牙齦分離器將唇側牙齦與齒槽骨撥分開，做成一個口袋 (Fig 05)，而範圍擴至兩鄰接牙的遠心端之外，整個手術並未再對軟組織做任何切開動作，其目的乃是做最低狀態的唇側美觀面傷害，以利將來整體的美觀回復。而前述口袋可將整片膠原蛋白再生膜完全固定住（也不用再釘上任何骨釘）(Fig 16-2)，如此一來，良好的固定性，會讓覆蓋的穩定性良好，以至其下所延伸覆蓋的骨再生移植充填物，能穩定復原 (Fig 16-4)。

The pouch, as submerged design as Fig 05

without any further cut on the gingiva of labial ridge, firmly holds the collagen membrane steadily so as to fix the GBR inside positively. Beside the above mentioned, there is no further surgery of any tissue graft until the delivery-day. That is, the lowest invasive move is supposed to achieve or promise the well-growth/outlook of the soft and hard tissues around #21(Fig 16-4).

- 在我們亞洲東方人的病例中，前牙拔除後，其唇側的齒槽骨壁通常很薄 (Fig 07-1)，不宜以原殘根的拔牙路徑當作植體植入路徑，以致將來唇側的骨壁萎縮而讓植體曝露出來。而亞洲東方人前牙區的咬合面牙脊平台一般也是窄小的，致使植體植入路徑很難以原拔牙路徑做依據，略推移向顎側來平行鑽下；因此，由原拔牙開口伸入鑽頭，但鑽入點位於偏顎側的齒槽斜坡上，且盡量靠近原牙根尖所在的骨凹陷處，而鑽入路徑要盡量想像著平行於原拔牙路徑，這樣所完成的植體植入路徑，還是會與牙齒拔除路徑形成一個小的角度 (Fig 06)，但會讓置入的植體與唇側骨壁之間，形成一個理想的寬大空間，用以填入足夠而飽滿的骨再生移植充填物 (Fig 10, Fig 16-1)。前述的角度偏差，用  $15^\circ$  的 BioHPP 支柱加以補償 (Fig 12, Fig 14-1)，若偏差的角度大於  $15^\circ$ ，其實還可透過修磨 BioHPP 支柱來修正，而這個動作也是易於達成的 (Fig 20-1)。

It's common for an Asian from Far East to have a thin labial alveolar wall (Fig 07-1) usually seen after front tooth extraction. Moreover, the alveolar crest is also thin so in-



evitably the path of insertion of the implant has to be designed a little bit palatally angular from the path of extraction, as Fig 06, like the case of #21 in this report to insure the future labial bone is grown thick enough by leaving a space for GBR (Fig 10, Fig 16-1) at least 2 mm in width from labial bone to the implant. The angular bias may be compensated by an BioHPP-abutment in 15° (Fig 12, Fig 14-1) and the compensation may be done more by crown-preparation on the BioHPP-abutment because BioHPP is easy to be ground out by a diamond burr (Fig 20-1).

- #21 拔除後的唇側骨壁雖然很薄 (Fig 07-1)，但卻是患者自身所有且具有供血的組織，在搭配了前述牙齦下口袋嵌入膠原蛋白再生膜，然後再覆蓋住寬厚的骨再生移植充填物之後，仍然具有很穩定的包覆成型與保護效果，提供其下方的骨再生與骨整合的穩定環境 (Fig 16-3, Fig 16-4)，也因此，多重的鈦網架固定與取出手術也就不需要了 (Fig 24-2)。

Even so thin but with natural blood supply and in a good holding form seen after extraction of #21 (Fig 07-1), the labial bone wall can do a good job firmly/steadily to hold/cover the GBR inside with a proper coverage of the collagen membrane on top roof to keep the osseo-integration well developed and soft/hard tissue well grown without interruption (Fig 16-3, Fig 16-4). Therefore any further graft with the aid

of being like put-on & taken-out the Titan frame is not necessary (Fig 24-2).

- 本病例患者的口腔衛生狀況長期不佳，每次來門診都是牙菌斑滿布於牙周的狀況，但是在裝置永久牙冠 9 個月之後回診時，發現之前 #21 兩鄰接面原本不存在的齒間乳頭，在 9 個月內全都長滿而填塞了整個齒間縫隙，使得 #21 永久牙冠交付當日所見到的兩鄰接面黑色三角空間，至此不復見而完全改善。由本報告臨床照片記錄回顧，發現本患者的牙菌斑雖到處堆積，但在 BioHPP 支柱處就是少見 (Fig 19, Fig 24-1)，推估也許是 BioHPP 同時具有生物相容性與表面細緻性所致。BioHPP 的表面細緻性 (surface roughness) 為  $0.05 \mu\text{m}$ ，牙菌斑難以在這麼平滑的表面堆積，以致於 BioHPP 的周圍不易有細菌生長，也就未對齒間乳頭的重新長出造成干擾。

From the recording photos of this treatment, there is seldom plaque accumulated around BioHPP-abutment even under long-term low-grade oral hygiene of the patient (Fig 19, Fig 24-1) so we still can see the original black triangles both mesial & distal proximal of #21 disappear in 9 months by being filled with well-grown interdental papillae. Beside being bio-compatible, it may be also due to the surface roughness of BioHPP which can achieve  $0.05 \mu\text{m}$  and it is hard to get plaque accumulation on such fine grained surface.

- 本患者的 #11 唇側面是舊有已變色黯沉的複合樹脂填補面，#22 則是本色偏黯黃但多

處去鈣化的天然牙，以致本病例的主角 #21 永久牙冠的比色難以抉擇 (Fig 19)。經與患者溝通商定，最後以 Vita-A2 比色的全銦牙冠，來做為 #21 的永久牙冠，患者自己會在日後經濟狀況許可後，以這個比色與材料為參考，來做其他牙齒的後續美觀改善治療 (Fig 23-1)。

After consult with Doctor, the patient chose Zr-crown in Vita-A2 shade to restore #21 as a beginning of a long way esthetic treatment for all the other front teeth since they are so disharmonic with each other in color shade (Fig 19) to be improved when he can afford it gradually (Fig 23-1).

### 參考資料 References

1. Markovic A, Calvo-Guirado JL, Lazic Z, Gomez-Moreno G, Calasan D, Guardia J, et al. Evaluation of Primary Stability of Self-Tapping and Non-Self-Tapping Dental Implants. A 12-Week Clinical Study. Clinical implant dentistry and related research 2011 Dec 15.
2. Frau Candida Sturz. Effect of different chair-side surface treatment methods on dental restorative materials with respect to contact angles and surface roughness. Uniklinik Koeln-Vorklinische-Zahnheikunde. 20.01.2014.
3. Sebastian Bauer, Marlis Eichberger, Bogna Stawarczyk, Retentionskraefte von Teilprothesenklammern aus PEEK-basierten kunststoffen. Ludwig-Maximillian Universitaet Muenchen-Poliklinik fuer Zahnaerztliche Prothetic. 08.05.2014.
4. Priv.-Doz. Dr. Dipl.-Ing. (FH) Martin Rosentritt, Prof. Dr. Carola Kolbeck. Versuch zur Ueberpruefung der AbzugSkraefte zwischen Abutment (Titan, BioHPP) und Kaepchen (ZrO2 BioHPP) mit 4 °/8 ° Konus-winkeln zur Verifizierung verschiedener Zemente. Universitaetsklinikum Regensburg-Poliklinik fuer Zahnaerztliche Prothetik. 01.07.2014.
5. Professor Lars Sennerby. Resonance Frequency Analysis for Implant Stability Measurements, INTEGRATION DIAGNOSTICS UPDATE 2015;1:1-11.