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Dr. P.I. Branemark 在1965年將第一個Endosseous Titanium Implant植入人體口腔之中，達到成功的骨整合，早期的人工植牙是專為Fully Edentulous Patients設計的，只要達到”骨整合”即算是成功的個案，但是隨著病人及牙醫師的要求越來越高，從早期拔牙後需等半年以上再進行人工植牙，進而到拔牙後6-8週，等到Soft Tissue Healing之後，即可進行人工植牙，目前已進步到拔牙後立即植牙，甚至在拔牙後立即植牙並同時安裝臨時假牙，所以病人在手術的當天即有假牙，不影響美觀。

目前最熱門的技術”Implants-in-one Hour”，牙醫師利用Dental Scan and Prefabricated Surgical Stent以定位精確的Implant Position，藉著Flapless Technique to do the Implant Surgery.

今日，Immediate Implant and/or Immediate Loading必須要有正確的Diagnosis and Treatment Plans才能成功達到骨整合，功能及美觀的完美結果。

Immediate Implants and/or Immediate Loading

前言

人工植牙臨床成功的標準在今日已不同以往，早期的人工植牙是專為Fully Edentulous Patients 設計的，只要達到”骨整合”即算是成功的個案，但是隨著病人及牙醫師的要求越來越高，從早期拔牙後需等半年以上再進行人工植牙，進而到拔牙後6-8週，等到Soft Tissue Healing之後，即可進行人工植牙，目前已進步到拔牙後立即植牙，甚至在拔牙後立即植牙並同時安裝臨時假牙，所以病人在手術的當天即有假牙，不影響美觀。

影響今日人工植牙成功與否的因素有以下三點：

1. 成功的骨整合(Osseointegration)
2. 補綴物修復之後，功能上的滿足，包括：沒有Screw Fracture or Loose，沒有Inplants Fracture，沒有Crowns or Denture Fracture
3. 美觀上的考慮，包括：足夠的Lip Support，Papilla 的保留，Emergence Profile 的建立

人工植牙治療計劃必須考慮以下五點：

1. Implant system 的選擇，包括：Implant Surface

(Machine Surface or Rough Surface), **Table 1 :**

Implant Anatomy
(Straight or Taper)

2. Case Selection 必須考慮：
Thick-flat Type Periodontium;
Thin-scalloped Type Periodontium，前者比後者容易達成美觀的結果。

3. Implant Position 必須考慮：頰舌側(Bucco-Lingual); 冠根側(Coronal-Apical) and 近遠心側(Mesio-distal)。

4. Immediate Implant 的取捨：病人的條件是否適合立即植牙。

5. Bone Graft 的選擇：
Ridge Augmentation or

Sinus Lift

Table 1 :

Wheeler's Study Shows

Anatomy of Natural Teeth
Implant company 對
implant recommendation
(**圖1&圖2**)

立即植牙時並須考慮
Socket Size，至少 3-4 mm
Bone Engagement in Apical
Area 以獲得Initial Stability
所以Implant Size 是一個重要的考慮因素，尤其是
Immediate Implant 的情況
Maxilla :

Central Incisors , Canines , Molars : 建議 Wide Diameter Implants .
Lateral Incisors : 建議 Narrow Diameter Implant or Standard Size Implant.

Premolars : standard size

implant.

Mandible : Central and Lateral Incisors : 建議

Narrow Diameter Implants.
Premolars : 建議 Standard Size Implant.

Canine and molars : 建議 Wide Diameter Implant.

Minimum restorative space(**圖1 & 2** Numbers in Yellow Color) : Which Shows You the Minimum Restorative Space Mesio-Distally.

植牙時的解剖考量：1. Alveolar Ridge的高度及寬度(Vertical Height and Width)。
2. Sinuses 的位置。



圖1

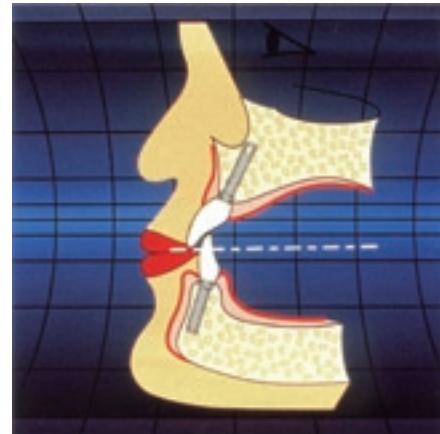


圖2

圖3



An implant placed at 45° to the occlusal plane emerges in a facial position.

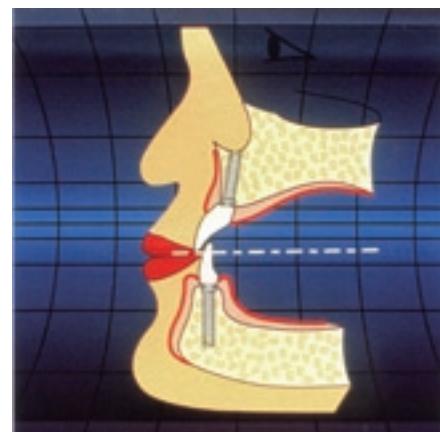


An ideal prosthetic contour can be observed when the implant is placed at 45° to the occlusal plane.

圖4



Position of the implant in an extraction socket when the implant is placed at approximately 65° relative to the occlusal plane.



Contour of the future prosthesis when the implant is placed at approximately 65° to the occlusal plane.

3. 與鄰牙間的距離將影響Implant Size 的決定。

4. Nasopalatal Foramen and Canal 的位置。

5. Mandibular Nerve 的位置。

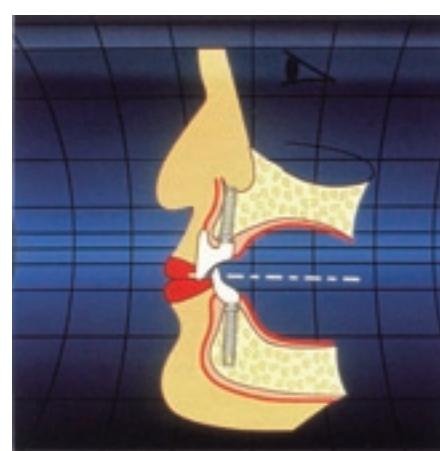
I m p l a n t

Position : Fereidoun Daftary's Study 在前牙區 Emergence Profile 的考量下，當 Implant 植於愈頰側時，Implant 可 Install 在較 Coronal 的位置；反之，若 Implant 植於愈舌側時，Implant 則須 Install 在較 Apex 的位置。(圖3-5)。

圖5



An implant placed perpendicular to the occlusal plane in the extraction socket exhibits an extreme palatal position.



When the implant is placed perpendicular to the occlusal plane, this contour may be expected in the future.

植牙與鄰牙的關係

根據Dr. Weisgold's Study牙周型態之間的關係在白種人中可大致分為兩種：

1. Thick-flat Type
Periodontium：此型的牙冠較Square，牙根較粗，Interdental Papilla較短，人工植牙後

較容易保留或重建

Papilla 的完整性。(圖6-1,7-1,8-1)

2. Thin-scalloped Type

Periodontium：此型的牙冠較Triangle，牙根較taper，Interdental Papilla 較長，人工植牙後較不容易保留或重建 Papilla 的完整性。(圖6-2,7-2,8-2)

Andre P. Saadoun and

Marcel's Study 指出，在 Maxillary Central Incisor 的位置，若植入較小的 Implant，則須將Implant 植入較深的位置；若植入較大的Implant，則不須將 Implant植入太深的位置。(圖9-1,9-2)

Dr. Weisgold's and Saadoun's Studies 個別指



圖6-1



圖7-1

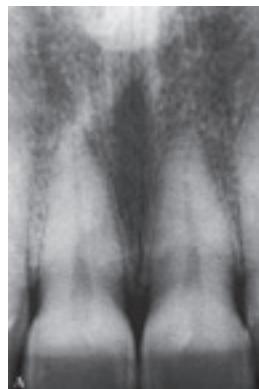


圖8-1



圖6-2



圖7-2

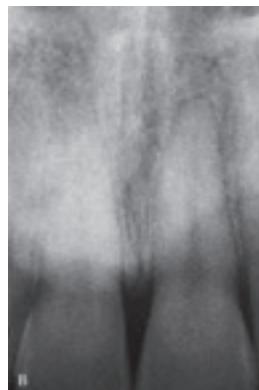


圖8-2

出Implant 的型態(Cross Section)不同於Natural Teeth; 前者是圓形，後者則是鈍三角型。所以 Implant 的 Size and 形狀

很難與 Natural Teeth 一致。(圖10-1,10-2)

Dr. Tarnow's and Saadoun's Studies 個別指出，當兩個植牙緊鄰

時，若彼此間的距離 $\geq 3\text{ mm}$ 時，則有機會保住 Crest of Ridge，而減少Bone Resorption and Papilla Collapse. 若從

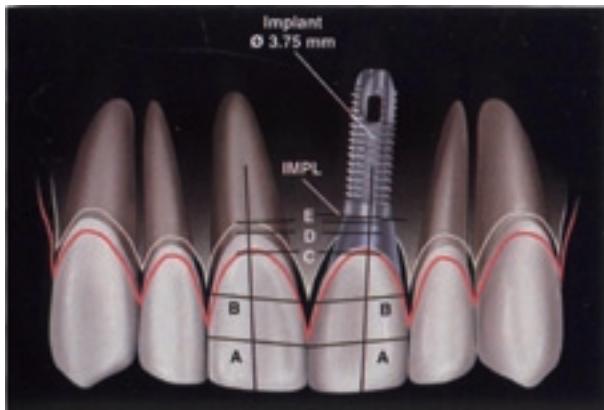


圖9-1

The transitional zone of the implant decreases with a 3.8 mm diameter as opposed to a 3.25 mm diameter.

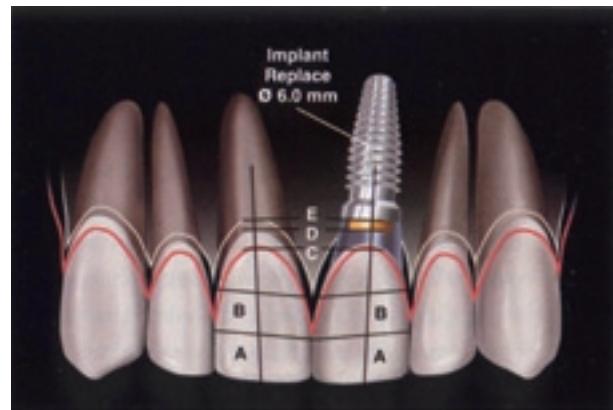


圖9-2

Utilizing a 6 mm diameter tapered, threaded implant, the apical location of the fixture head is at the crest of the bone.

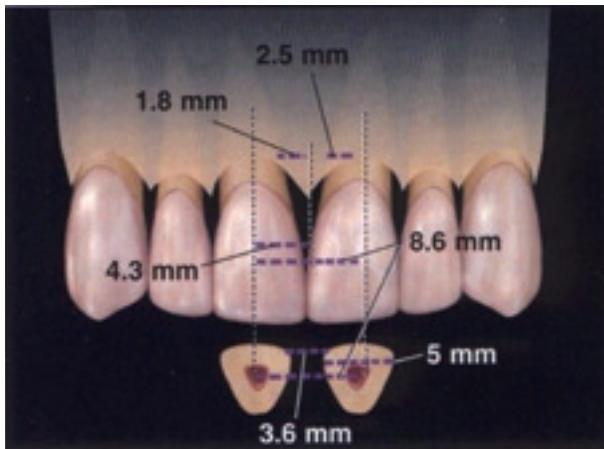


圖10-1

Diagram of ideal tooth / bone relationship with optimal interdental alveolar bone.

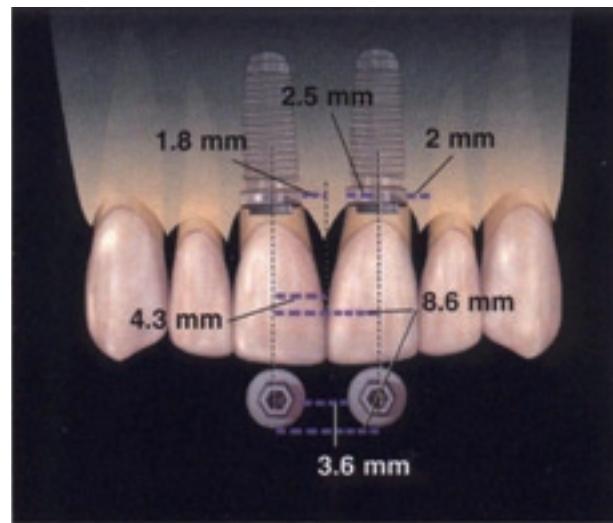


圖10-2

Diagram indicates that the minimum interproximal bone between two adjacent implants should not be less than 3 mm and 2 mm from the adjacent teeth.



圖11-1

Radiographic measurements recorded. A and B represent the lateral distance (bone loss) from the implant to bone crest; C, vertical crestal bone loss; and D, the distance between implants at the implant-abutment interface.

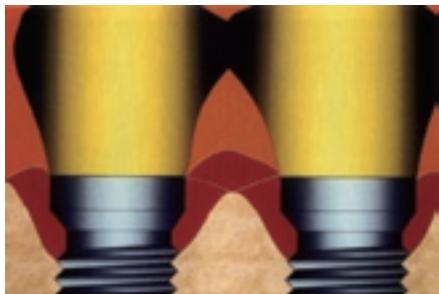


圖11-2

Inter-implant distance greater than 3 mm. Lateral bone loss from adjacent implants (A and B from Figure 1) dose not overlap, with minimal resultant crestal bone loss (C from Figure 1).

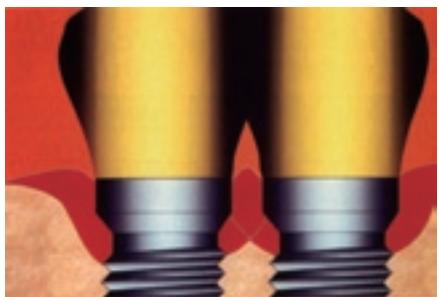


圖11-3

Inter-implant distance 3 mm or less. Lateral bone loss from adjacent implants (A and B from Figure 1) overlap, with resultant increase in crestal bone loss (C from Figure 1).

Contact Point 到 Alveolar Ridge 的距離 $\leq 5\text{ mm}$ 時，則有 98% 的機會可保留住 Papilla。 (圖 11-1, 11-2, 11-3)

Case Report

筆者將提出以下三個 Cases，加以討論：

Case I :

23 y/o Female, Medical School Student，左上側門牙 (#10) Root Canal Treatment Was Done 7 Years Ago, X-ray Shows Internal Resorption and Radicular Cyst, and Vertical Fracture。 (圖 12-25)

Treatment plan :

基於美觀及時間的考量，Immediate Implant Was Considered. 如此可減少拔牙後 Buccal Plate and Alveolar Bone 吸收的問題。

Treatment :

手術時，使用 Periotome 剝離 PDL，儘量保留 Socket 的完整性，以 Probing Gauge 確定四

周骨頭的完整性，在 Degranulation 之後，確定 Soft Tissue 清理乾淨。由於病人有 Radicular Cyst，如果 Cyst 在拔牙時完整剝離則為最佳，若無法完整剝離則須確定 Socket 清理乾淨，可用 Round Bur or Curet. Socket 的表面可以 Free Gingival Graft, Surgicel or Leave Socket Exposed. 若 Implant 和 Bone 之間的距離 $\leq 2\text{ mm}$ ，骨頭會自行癒合；若 $> 2\text{ mm}$ ，則須 Bone Graft. 6-8 個月之後進行 Stage II Surgery，同時取模並建立 Temporary Abutment and Crown，待 Soft Tissue Healing and Mature，完成 Final Crown，圖中顯示 #10 and #7 對稱性 (Symmetry) 良好，Papilla 保存完整，Cyst 處的骨頭也完全癒合。

Case II :

45 y/o Female，Housekeeper，左上乳犬齒 (#H) External

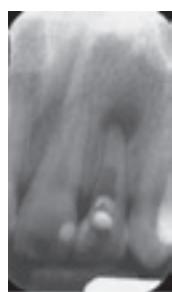


圖12



圖13



圖14



圖15



圖16



圖17



圖18



圖19



圖20



圖21



圖22



圖23



圖24



圖25

Resorption , Mobility(II) ,
病人不要Immediate Partial
Denture. (圖26-33)。

Treatment plan :

考慮病人在手術後
可以立刻安裝Provisional
Crown , 將執行 Immediate
Implant and Immediate
Loading.

Treatment :

Primary Canine Was
Extracted, Socket Was
Degranulated, Implant Was

Installed Without Exposure.
Temporary Abutment and
Crown Were Fabricated ,
確定 Temporary Crown 沒
有咬合接觸 , 術後6-8個
月完成 Permanent Crown.
此種Case必須考量 Case
Selection : Enough Bone
Support is Important for
Initial Stability , 與鄰牙
間骨頭破壞越少越好 ,
以利於Papilla的保留 ,
Provisional Crown 儘量避
免咬合接觸 。

Case III :

40 y/o Male 右上
第一大臼齒(#3) , Root
Canal Treatment and Crown
Were Done 15 Years Ago ,
the Crown Came Out and
Caused Tooth Fracture. (圖
34-41)

Treatment plan :

基於時間的考慮 , 病
人要求 Immediate Implant.

Treatment :



圖26



圖27



圖28



圖29



圖30



圖31



圖32



圖33

將 1st Molar 切成三部份，分別將三個牙根拔出，以保留骨頭的完整性，植入 5 mm (Wide Diameter) Implant 於 Septum 位置，由於 Maxillary 1st Molar 牙根外展的特性，其 Septum 的位置有足夠的骨頭，以達成 Initial Stability Osteotome Sinus Lift

Procedure Was Done in the Same Time，將 Bone Graft Material 植入 Socket and Sinus, Coronal Positioned Flap，以達成 Primary Closure. Stage II and Final Crown 分別於六個月和八個月之後完成。

Discussion & Conclusion

Immediate Implants 的優點：於前牙區，拔牙

後立即植入 Implant，可以防止 Buccal Plate 的 Resorption and Collapse，如此日後病人將不須要大量的骨頭移植；若在手術進行當中有 Penetration or Dehiscence，則須 Open Flap，進行 GTR or GBR，以防止 Soft Tissue 長入 Implant 與 Bone 之間，而導致植牙失敗。



圖34



圖35



圖36

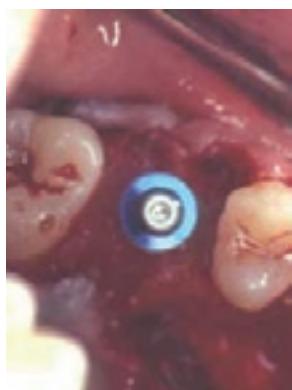


圖37

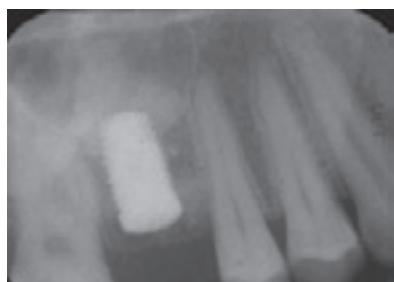


圖38



圖39



圖40



圖41

早期的觀念若Natural Teeth有感染時，則建議拔牙後6-8週待Soft Tissue 瘢合，感染消失之後再進行植牙，及所謂的Delayed Implant Surgery.然而隨著病人及牙醫師的要求改變加上時間上的考量，Immediate Implant 越來越普遍。

Immediate Implant 於後牙區則非絕對必要，時間上的考量是一大要素。

總而言之，Immediate Implant and/or Immediate loading必須要有正確的Diagnosis and Implant Treatment Plan 才能成功，達到骨整合，功能及美觀的完美結果。

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