
ACTILINK Reborn

(電漿親水性活化器)

NeoBiotech

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I . ACTILINK Reborn 介紹

電漿親水性活化器

ACTILINK Reborn



* 專用Holder



Fixture
專用



material
專用

▣ 優點

- 真空低溫電漿方式親水性活化器
- 高強的能量等級：20 eV 以上
 - 與Fixture 內的碳氫化合物結合力：~13.6 eV
 - 各種處理方式的能量等級
 - UV 方式：4 eV
 - Argon Gas方式：8 eV
- 多樣化的適用性
 - Fixture：骨整合能力上升
 - Abutment：組織結合力改善
 - 材料：生物相容性提升
 - 補綴物：安全性增加
- 臨床有效性驗證：保有多篇國際論文

II. ACTILINK Reborn 優點 - ① 高強的能量等級

優點 1.

高強的能量等級 : 20 eV 以上

- 與 Fixture 內的碳氫化合物結合力 : ~13.6 eV

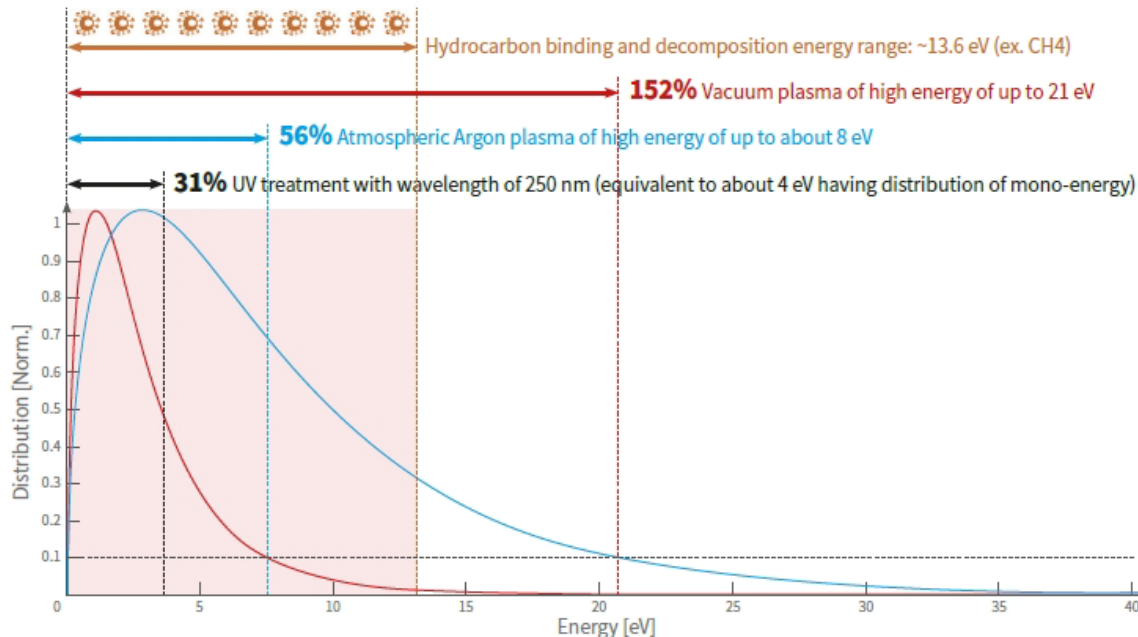
- 各種處理方式的能量等級

UV 方式 : 4 eV

Argon Gas 方式 : 8 eV

通過 20eV 以上的能量等級
去除植體表面的碳氫化合物雜質,
可確保無菌乾淨的植體

植體上雜質結合力與各種處理方式的能量等級



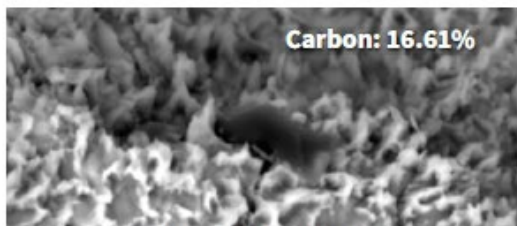
最佳的真空環境

在 (5~10 torr, 約形成99%的真空狀態),
直接在植體表面形成電漿 (Glow discharge),
可有效的去除碳氫化合物雜質 (CH_x)
(CH_x + O₂ + Plasma -> CO₂ + H₂O)

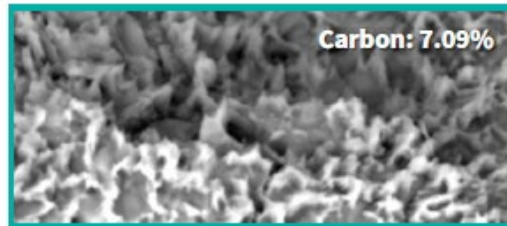


* 參考 1. ACTILINK 電漿處理效果 – 去除雜質

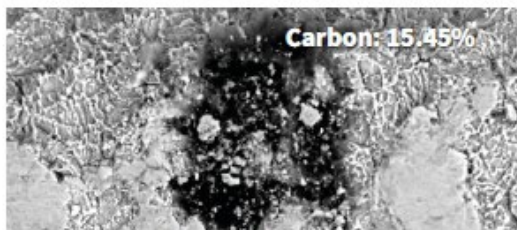
* 植體表面的雜質去除性能測試



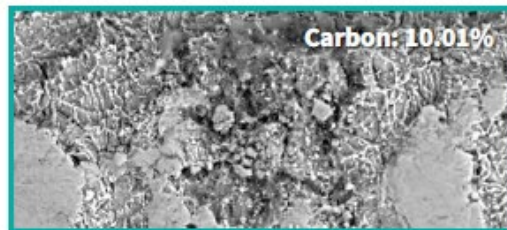
Before the Treatment



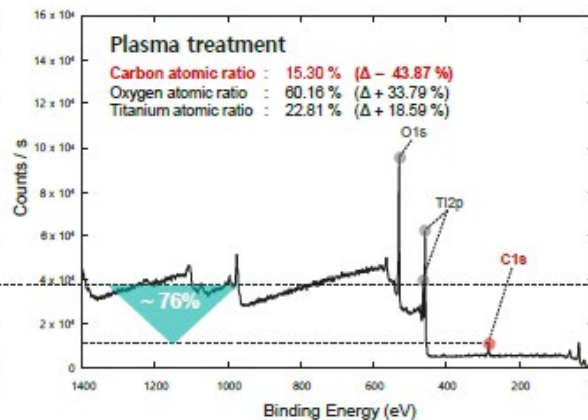
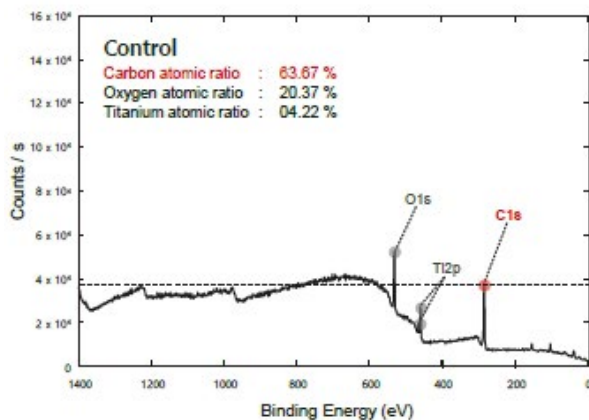
After Treated



Before the Treatment



After Treated



II. ACTILINK Reborn 優點 – ② 多樣化的適用性

優點 2.

多樣化的適用性

- Fixture : 骨整合能力上升
- Abutment : 組織結合力改善
- 材料 : 生物相容性提升
- 補綴物 : 安全性增加

在牙科所需的各種材料上可適用
植牙系統的多種材料可使用



II. ACTILINK Reborn 優點 – ② 多樣化的適用性

優點 2.

多樣化的適用性

- Fixture : 可使用於各品牌的植體
- Abutment : 可使用各品牌的支台體
- 材料 : 可使用各品牌的骨移植材料
- 補綴物 : 可使用各品牌的補綴物

在牙科所需的各種材料上可適用
植牙系統的多種材料可使用

[Close Type]

Ampule Holder

임플란트 제조사를 위한 맞춤형 앰플 홀더



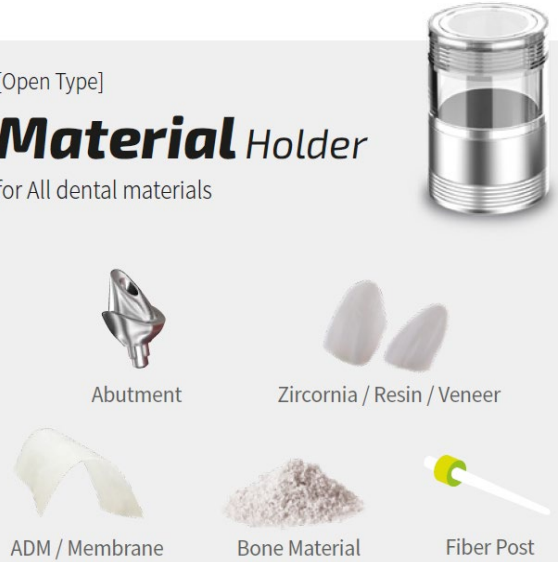
28 Brand Ampule Libraries

| | | | | |
|---------------|--------------|------------------|----------|-----------|
| Osstem | Dio | Sweden & Martina | Warantec | iRes |
| Dentium | Neobiotech | IBS | ACH | TRI |
| Straumann | Dentis | Bredent | Cybermed | BEGO |
| Zimmer | Megagen | Biotem | Oneday | AB Dental |
| Astra | MIS | Cowelmedi | Withwell | Callus |
| Nobel Biocare | Bio Horizons | SIC | Toplan | Neoss |

[Open Type]

Material Holder

for All dental materials



Abutment

Zirconia / Resin / Veneer

ADM / Membrane

Bone Material

Fiber Post



II. ACTILINK Reborn 優點 – ② 多樣化的適用性



Enhanced
Osseointegration

植體

提高骨整合效能,縮短恢復時間,提升手術的成功率

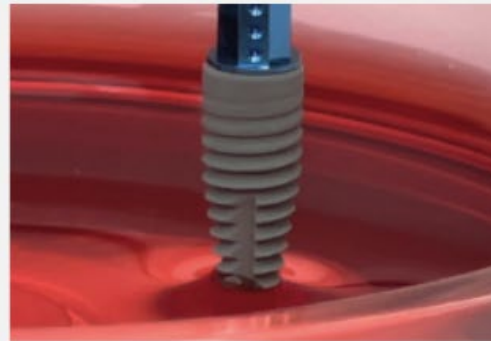
支台體

提高與軟組織的整合能力,更加緊密地結合



Enhanced
Tissue Integration

Dental Implant



before



After Plasma Treated

II. ACTILINK Reborn 優點 - ② 多樣化的適用性

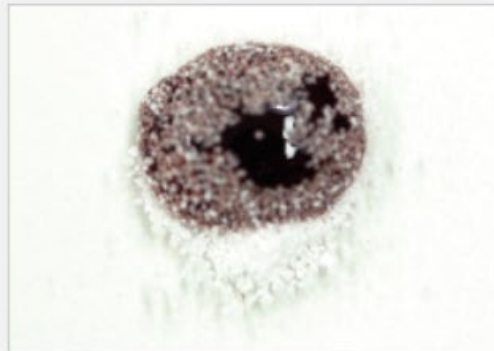


Enhanced
**Hydrophilicity for
Material Handling**

骨移植材料

增強材料與其他組織間的粘附力

Bone Material



before



After Plasma Treated

II. ACTILINK Reborn 優點 - ② 多樣化的適用性

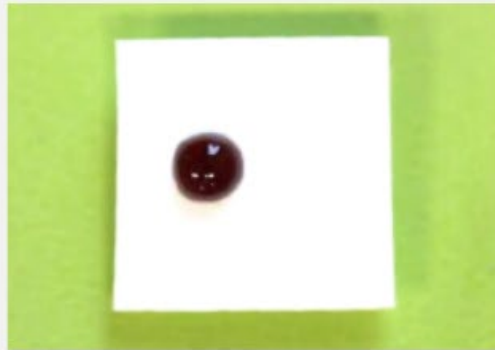
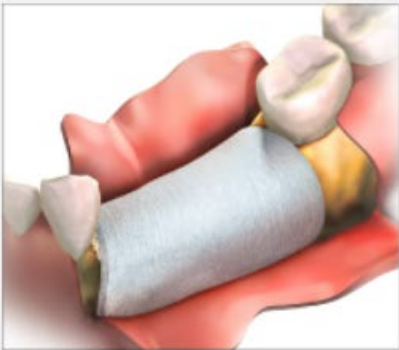


**Enhanced
Fibroblast Activity
& Material Handling**

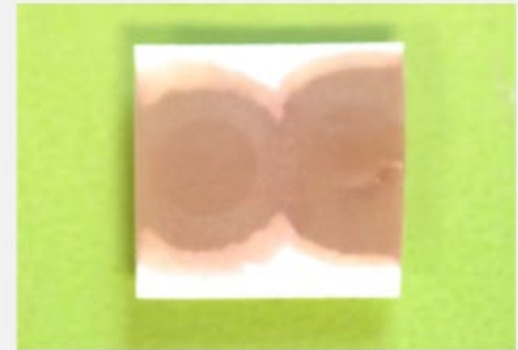
Membrane 膜

增強纖維母細胞活性, 加速組織修復

Membrane



before



After Plasma Treated

II. ACTILINK Reborn 優點 – ② 多樣化的適用性

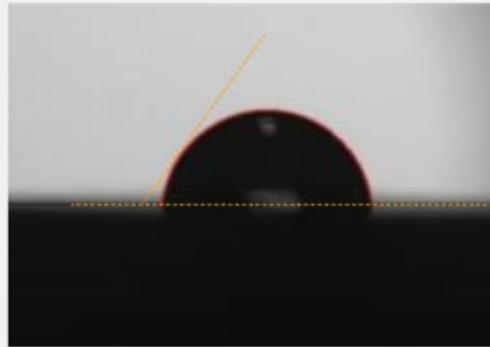


Enhanced
**Uniformity and
Strength of Bonding**

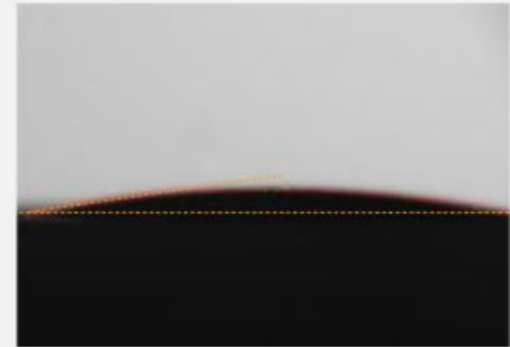
補綴物(牙冠)

提高材料的均勻性與粘結強度

Zirconia



before



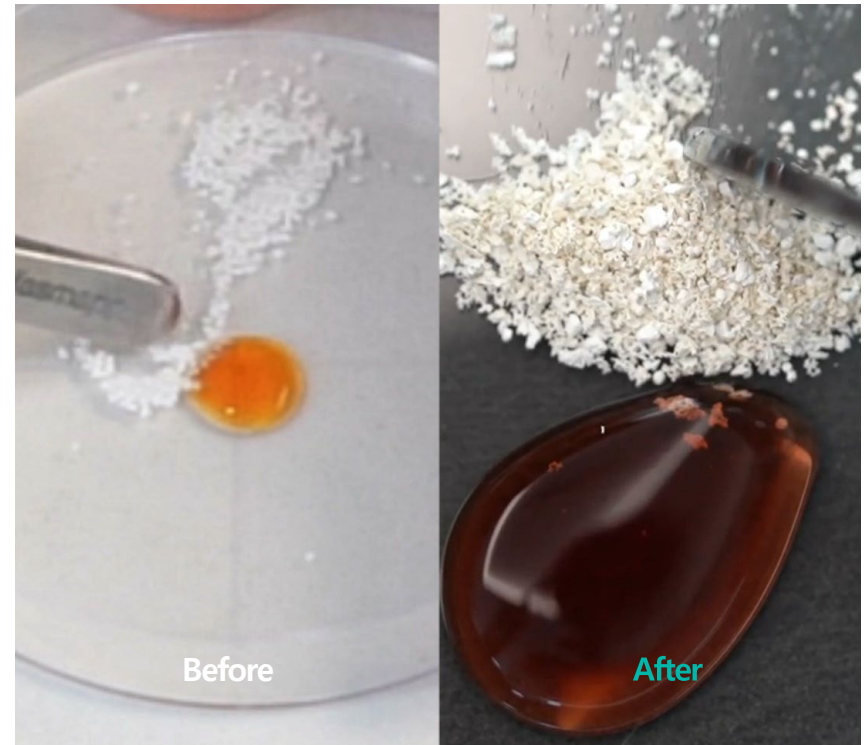
After Plasma Treated

* 參考 2. ACTILINK 電漿處理效果 - 親水性比較影片

ACTILINK Implant 處理後的比較影片



ACTLINK Bone graft 處理後的比較影片



II. ACTILINK Reborn 優點 - ③ 臨床有效性驗證


優點 3.

臨床有效性驗證：保有多篇論文

美國 Harvard 大學教授團隊 *in vivo* study (Canine model) 上
驗證了 BIC 的上升及生物學的安全性

IN DEPTH WITH

ACTILINK Reborn: Enhancing osseointegration and hydrophilicity of dental implant



Even for implants with SLA surface treatment that maximises biological compatibility, hydrocarbons in the air cover 60-75% of the total surface area on the implant surface after one month or more. This phenomenon is a biological ageing that hinders osseointegration between the implant and bone.

Plasmapp, manufacturer and supplier of solutions for sterilising medical devices and regenerative activation of dental implants, raised a fundamental question about the removal of implant impurities constantly. They studied plasma technology that can improve osseointegration performance by

removing hydrocarbons formed in titanium implants, and has recently launched ACTILINK Reborn.

ACTILINK Reborn is a plasma regenerative activator for implant utilising vacuum plasma to maximise surface treatment performance.

The titanium surface has an electrostatic negative charge, and after vacuum plasma surface treatment through Bio-RAP (Regenerative Activation by Plasma) technology, the implant surface is changed to a positive charge, and hydrocarbons and impurities that deters osseointegration are removed.

The vacuum plasma generates plasma energy while strongly sucking air inside the vacuum tube resulting to enhanced hydrophilicity, blood wettability, and increased protein adsorptions that attract the factors forming the bone.

By having such dramatical biocompatibility, the stabilisation period of surgery can be greatly shortened eventually, and the implant can be regenerated and reactivated through plasma treatment within one minute before implant surgery.

ACTILINK Reborn key points:

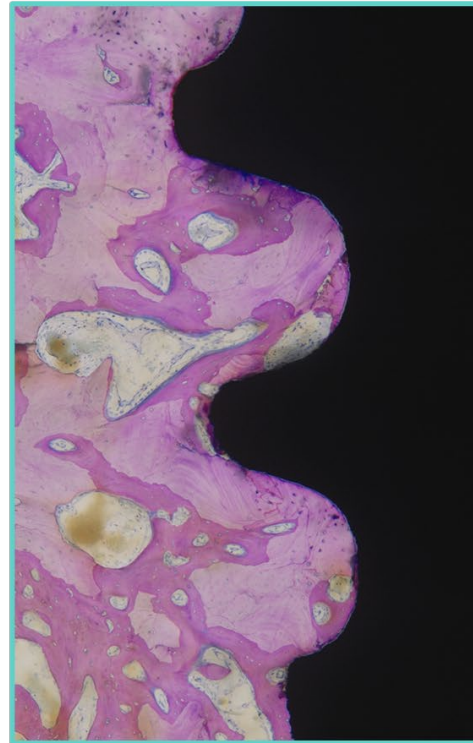
- First universal plasma irradiator for any implant
- Remove hydrocarbons, convert hydrophobicity to hydrophilicity
- Faster healing and osseointegration time in three to four weeks
- Excellent blood wettability, it promotes superb hydrophilicity for increasing bone to implant contact
- Increase initial fixation strength and success rate
- More than three days surface retention, with vacuum plasma surface treatment technology
- Visible and reliable vacuum plasma treatment process
- No occurrence of ozone and harmless to the human body

Plasma Performance of Enhancing Osseointegration

| | | | |
|-------------------------------|---------------------|-------------------------------|---------------------|
| | | | |
| Control Hydrophilic Treatment | After the Treatment | Control Hydrophobic Treatment | After the Treatment |
| | | | |
| Control Hydrophobic Treatment | After the Treatment | Control Hydrophobic Treatment | After the Treatment |

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Total BIC (Bone to implant contact): 92.9% = Osteoid (1.38%) + New Bone (77.7%) + Old Bone (7.13%)



In vivo study (Canine model) performed by Prof. David Kim of Harvard Univ.

II. ACTILINK Reborn 優點 - ③ 臨床有效性驗證

優點 3.

臨床有效性驗證：保有多篇論文

保有其他多篇國際論文



Gas Plasma Treatment Improves Titanium Dental Implant Osseointegration - A Preclinical In Vivo Experimental Study

Myron Nevins, Chia-Tai Sheen, Stephanie Parma-Berzetti, David M. Kim

Result & Discussion

In conclusion, this preclinical study underscored the potential of nonthermal plasma treatment in enhancing dental implant osseointegration. Despite a small sample size, the plasma-treated implants demonstrated superior osseointegration and reduced vertical bone loss, suggesting the potential for shorter healing times before proceeding with prosthetic loading and improved long-term stability. While further research is needed to validate and optimize this treatment, these findings highlight its promising clinical significance in potentially improving patient outcomes in dental implant therapy.



Dental implant surface properties, such as chemical composition, electrical charge, roughness, surface energy, morphology, and wettability, play an important role in determining the cascade of biological events that allow osseointegration [4]. Dental implant surface treatments, such as plasma spray, laser treatment, acid etching, anodizing, nanometric deposition, and sand blasting, followed by acid-etching have all allowed for faster osseointegration and reduction in loading time [4]. The results showed that plasma treatment did not significantly affect the implant torque value (TV) and implant stability quotient (ISQ) at the time of implant insertion. We decided not to measure ISQ during the observation period in order to avoid disturbing the osseointegration process. The radiographic bone level during the early osseointegration stages (2 and 4 weeks) was comparable; however, at the 6-week mark, the plasma-treated group showed significantly higher radiographic bone levels than the non-plasma-treated control group. Our results further substantiate findings from previous in vivo studies that have reported the beneficial effects of plasma treatment on dental implants. Duske et al. reported that cold atmospheric plasma treatment reduced contact angle and supported the spreading of osteoblastic cells; furthermore, the treatment effectively removed the biofilm [25]. Feng et al. demonstrated that a benzene plasma treatment at the time of implant placement could alter the surface energy of an implant without modifying the chemical composition and enhance osteoblast cell differentiation [26].

Lee et al. have conducted extensive in vitro studies, such as hydrocarbon contamination analysis, protein adsorption assays, cell proliferation assay, cell differentiation assay, and scanning electron microscope (SEM) analysis, to examine the effect of plasma treatment on dental implants [15]. With SEM analysis, there was no noticeable difference between the conditions of the sandblasted large grit acid-etched surface before and after the plasma treatment in terms of cracking or compression. This study revealed a 30% reduction of hydrocarbons, a 20% increase in protein adsorption, a 33% increase in cell attachment to the implant surface, and an 18% increase in alkaline phosphatase activity. These results indicate that plasma treatment efficiently eliminates the hydrocarbon, enhancing protein adsorption and improving cell adhesion, proliferation, and differentiation.

Table 4 summarizes key data demonstrating a significant difference in BIC between control and test.

Figure 4: Representative histology images from control and test groups. Scale bars indicate 100 μm. * indicates statistical significance (p < 0.05).

Table 4: Summary of key data demonstrating a significant difference in BIC between control and test.

Vacuum plasma treatment device to enhance fibroblast activity on machined and rough titanium surface

Carullo Luigi, Genova Tullio, Chignò Giorgio, Roberta Iacono, Paolo Pisco, Maria Marini, Massimo Federico

Discussion

This new plasma surface treatment device generates vacuum by removing 99% of atmospheric gases to obtain an optimized condition for discharging plasmas, and this device has been used for implant fixtures to have enhanced osteoblast activity and to speed osseointegration performance [23,24]. As already demonstrated, plasma bioactivation is able to determine an increase in the surface energy of the abraded and consequently reduce contact angle, enhance the wettability and make the surface more hydrophilic. Surface wettability, by improving the interaction with the blood clot, increases protein adsorption, such as fibronectin and vitronectin, with a positive effect on cellular adhesion, spreading and proliferation [18, 20,21,22]. This study also showed that fibroblast adhesion is significantly increased after Plasma treatment for 15 and 30 seconds in both samples in the early stages of wound healing (20 minutes after treatment), but also that the statistical difference with the negative control group tends to flatten out after 24 hours. The bioactivity of the plasma, appreciable both with the trend of protein adsorption and cell adhesion, disappears after 24 h due to the saturation effect, because of the diameter of the titanium disk. The present results are consistent with other studies and suggest that plasma bioactivation induces a stronger fibroblast adhesion on abraded surfaces even in the initial stages of the treatment [15, 18]. The clinical advantage of bioactivation is not only a quantitative one, related to a greater number of adherent cells, but also a qualitative one. The latter is due to the morphology of the adhered cells, as it can be seen from the SEM images, while in the control group a flat arrangement is observed, in the bioactivated samples a spread arrangement is shown. One possible speculation is that, together with the qualitative and quantitative increase, the cell is being driven by three-dimensional geometry towards faster differentiation. This results in better cell / abradement integration, as confirmed already by Carullo et al. 2021, even in the initial phase [16].

This study further confirmed the efficacy of plasma treatment. The advantage of the plasma device studied in this manuscript is the reduced action time required. In the previously analyzed devices, active effect of plasma was generated after 12 min and using acid-neutral processing gas of argon. It is important to emphasize that the tested plasma device provides its maximum effect with the plasma treatment for 15-30 sec. Based on the findings from previous studies, plasma treatment can chemically modify metal surfaces [40]. Analyses, such as EDS and XPS, have demonstrated the effectiveness of plasma treatment in eliminating organic contaminants and oxidizing the metal surface [20,21,22, 40]. Therefore, we assumed that there is an optimal range of these cleaning and oxidation process that enhances protein adsorption and cell adhesion. As indicated by our results, exceeding this optimal threshold may result in counterproductive effects, undermining the significance of identifying the ideal treatment conditions to attain the desired outcomes. Moreover, for the first time, a vacuum plasma treatment device not fueled by argon gas was used. Therefore, this device represents a clear practical advantage not only in terms of "clinical" time but also in terms of safety regulation. In fact, a rigid hermeticity regulates the use of this red gas.



Improvement of osseointegration efficacy of titanium implant through plasma surface treatment

Hyunyoung Lee, Hyun Joong Jeon, Aia Jung, Jinwoo Kim, Jun Young Kim, Seung Hun Lee

Hyoa Kim, Moon Seung Yoon, Wonho Choe, Inmi Gwon, Young Lim

Result & Discussion

The surface of SLA and SLA-Plasma was scanned with SEM to confirm whether the plasma treatment causes any physical change to the implant surface. As can be seen in the 5,000x and 10,000x images in Fig. 4, there is no noticeable difference between the surface condition before and after plasma treatment. More importantly, no damage such as cracks or corrosion sites was identified on the implant surface after plasma treatment. The macro- and micro-roughness in SLA surface is important for osseointegration, and these results demonstrate that plasma treatment maintain the unique topography of the SLA implant surface without affecting the intrinsic surface of the implant (Fig. 4).

Fig. 4 The SEM images of the implant surface of a) SLA, b) SLA-Plasma before and after plasma treatment.

The degree of hydrocarbon contamination was determined by X-ray photoelectron spectroscopy, with an energy peak at 285 eV representing the atomic percentage of carbon. It can be seen that the SLA and SLA-Plasma have carbon percentages of 36.7% and 11.0%, respectively, demonstrating that more than 50% of the hydrocarbons on the implant surface are eliminated by the plasma treatment as shown in Fig. 5a. It has been reported that protein adsorption to the implant surface increases with a decreasing number of carbon atoms on the surface, indicating a strong negative correlation with a high coefficient of determination (R² = 0.930) between the number of carbon atoms and the amount of adsorbed protein on the implant surface. Similarly, when carbon is gradually eliminated, osteoblast adhesion grows substantially, and the amount of hydrocarbon atoms is also known to be strongly related to cell adhesion rates. Therefore, we use proteins and cells to perform in vitro experiments to identify the effects of plasma-treated surfaces on osseointegration efficacy. Fibronectin is used in the protein adsorption experiments. When a titanium implant is placed into a bone, protein adsorption occurs on the implant surface when it is the first physiological phenomenon when it comes into contact with physiological fluids around the site. Among the numerous extracellular matrix (ECM) proteins, fibronectin, in particular, plays an important role in promoting cell adhesion and proliferation by providing an integrin-binding site. We compared the amount of protein adsorbed to the SLA and SLA-Plasma surfaces to investigate the effects of plasma treatment on fibronectin adsorption. As shown in Fig. 5b, the amount of protein adsorbed to the surface of the SLA and SLA-Plasma is measured to be 2,029 ± 216.4 and 2,529 ± 95.1 ng, respectively. Plasma treatment appears to increase protein adsorption to the implant surface by 24.6%. The number of cells on each implant surface is then measured using a microplate reader at a wavelength of 450 nm. As shown in Fig. 5c, the number of cells attached to the implant surface is approximately 38.5% higher in the SLA-Plasma than in the SLA immediately after the 2-hour time point. This implies that plasma treatment significantly enhances the cell adhesion efficiency. Also, it can be seen that the number of cells in the SLA-Plasma group is approximately 40.2% higher than that in the SLA group after 5 days of incubation, confirming that cells proliferate better on plasma-treated surface. (Fig. 5c). ALP activity is then evaluated after 7 days of culture to assess the level of differentiation. ALP is generally used as an initial marker of osteogenic differentiation, and high ALP activity indicates that cells are more capable of differentiating and functioning as osteoblasts. The ALP activity of the SLA and SLA-Plasma groups is 2.78 ± 0.42 and 2.23 ± 1.23 units/ml, respectively, as shown in Fig. 5d, demonstrating that ALP activity in the SLA-Plasma group is approximately 81.5% higher than that in the SLA group.

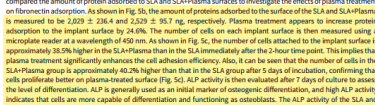


Fig. 5 Results of XPS analysis, protein adsorption, cell proliferation, and ALP activity for SLA and SLA-Plasma groups.

Figure 1: Representative images post for condition of discs with and without plasma at different exposures. Quantitative significant differences can be observed between control and plasma-treated groups.

Figure 2: Protein adsorption was evaluated on MAC 100 samples at 20 min and 40 min plasma treatment for 15, 30 and 60 seconds. The amount of protein adsorption was measured using a microplate reader. Error bars represent mean ± SD. The asterisk (*) indicates the statistical significance vs. CTRL, where controlling a 2-tailed t-test.

Figure 3: Cell proliferation was evaluated on MAC 100 samples at 20 min and 40 min plasma treatment for 15, 30 and 60 seconds. The level of cell adhesion was measured using the number of adherent cells for each well. Error bars represent mean ± SD. The asterisk (*) indicates the statistical significance vs. CTRL, where controlling a 2-tailed t-test.



Enhanced Osteoblast Adhesion and Proliferation on Vacuum Plasma -Treated Implant Surface

Hyun Joong Jeon, Aia Jung, Hee Jin Kim, Jeong San Seo, Jun Young Kim, Moon Seung Yoon, Gwi Gwon, and Young Lim

Discussion

N2 plasma treatment on TiO₂ was shown to reduce Ti³⁺ to Ti⁴⁺ in UV treatment, generating oxygen vacancies and leaving TiO₂ positively charged. It has also been demonstrated that air-based O₂ plasma treatment forms a hydroxyl (OH) group on the TiO₂ surface, which is known to improve the hydrophilicity and binding affinity with proteins. Based on the previous studies, the increase in hydrophilicity, improvement in protein adsorption, and cell adhesion observed in our study can be considered a result of the plasma-induced chemical process on the implant surface. In our in vitro investigation, the plasma-treated implant (PCSLA) showed significantly higher levels of protein adsorption, osteoblast adhesion, and differentiation than the non-treated implant (CSLA). In addition, when observing the morphology of cells attached to PCSLA cells were more evenly and widely attached than that on CSLA. These results are believed to be relevant to the increase in hydrophilicity of the implant by the plasma. Ujino et al. have reported that plasma-induced surface modification increased hydrophilicity, cell adhesion, and further upregulated osteogenesis-related genes such as Runx2, ALP, and BMP2. In addition, they observed twice as much calcium deposition on the plasma-treated titanium surface compared to the control, indicating a high degree of clinical relevance.

As mentioned in the Section 1, hydrocarbon-based impurities are generally known to determine protein adsorption and osteoblast attachment. Aia et al. (2009) have shown a strong negative correlation between the level of carbon and the attractiveness of protein and cells. Accordingly, they suggested that carbon removal contributed to improving bone-implant integration. Therefore, our experimental results in which plasma treatment reduced the amount of carbon on the implant surface are very encouraging. Plasma contains various high-energy species, including electrons, charged species, reactive oxygen species, metastable atoms, UV photons, etc. Given the fact that there is no extra gas supplied to our plasma device, the main discharge gas is air. In consequence, plasma will contain oxygen-related species such as O⁺, O²⁺, O⁻, and O⁻. In a number of investigations related to plasma cleaning, researchers have demonstrated that carbon contaminants react with these oxygen-based species and become oxidized and reduced, releasing CO and H₂O. Furthermore, continuous pumping to maintain a vacuum in the package removes these by-products immediately after they are released, eliminating the possibility of re-contamination.

More importantly, all of these plasma-byproducts were achieved without causing any damage to the implant's existing calcium coating or microstructure. This is crucial in applying plasma treatment to the calcium-coated implant because if the plasma treatment damages the calcium coating, the osseointegration efficiency may be impaired rather than improved. According to many previous studies, calcium coating on the implant is known to promote osseointegration. Feng et al. (2006) have demonstrated that calcium coating on the implant surface increases the adsorption of protein and improves the adhesion and proliferation of cells. They reported that the calcium coating positively charged the implant surface with Ca²⁺ ions, which created a favorable environment for FN and Vitronectin (VN) adsorption, leading to increased osteoblast attachment.

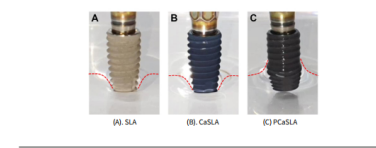


Fig. 6 Results of XPS analysis, protein adsorption, cell proliferation, and ALP activity for SLA and SLA-Plasma groups.

III. 使用方法

① 開啟電源

- 請開啟產品背面的電源開關

- 確認電源線已連線
- 確認電源按鈕處於開啟



② 表面活性化準備

- 開啟電源後,前面的LED燈亮起

- 確認設定模式 Rocket (紫光) or Vortex (藍光)



③ 準備 Holder

- 把處理對象置於 Holder 中

- Rocket 固定於 Fixture Driver 上連接在 Rocket

- 使用 Implant Holder (植體專用), 必須植體與 Holder 的蓋子打開



④ 放置 Rocket or Vortex Holder

- 請把放置好植體的 Rocket Holder / Vortex Holder (植體專用) / Vortex Holder (材料專用) 上

- 把 Holder 放置在中間安置區 (銀色)



⑤ 進行表面活化

- 請按上面的按鈕
- 真空管自動下降並進行表面活化

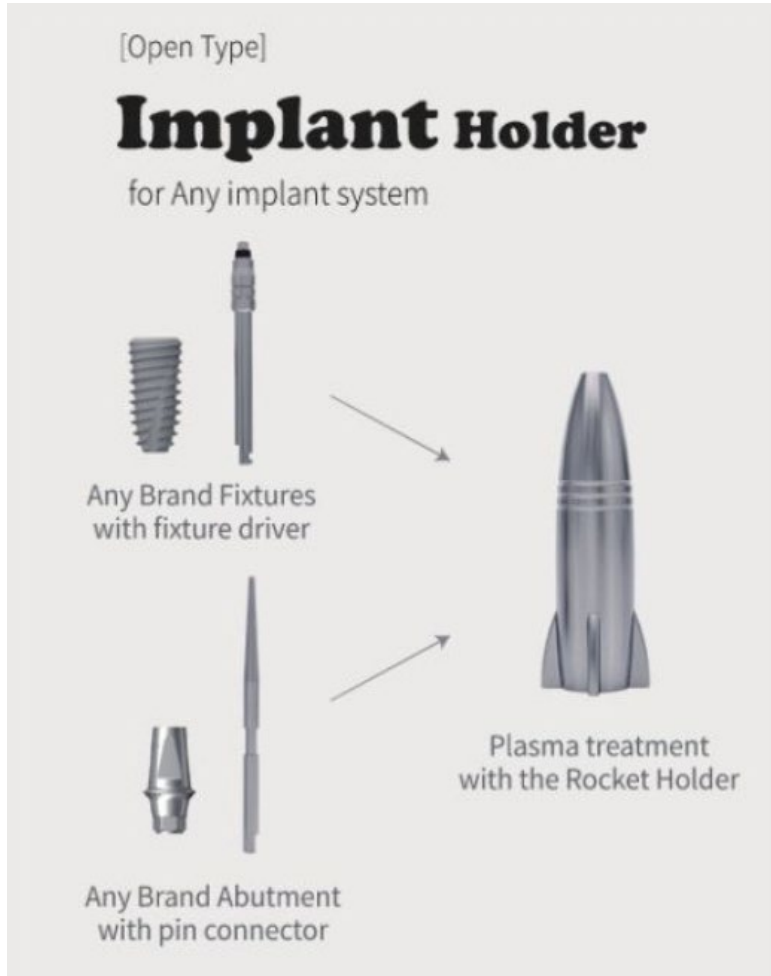


⑥ 表面活化完成

- 完成後,真空管自動上升並取回 Holder



III. 使用方法



Rocket Holder

- 可使用任何廠牌植體
- 請切換為紫燈 (Rocket專用)
- 植體連接該植體廠牌的Fixture Driver並連接在Rocket
- 使用Abutment連接專用 pin connector

III. 使用方法

Implant Vortex Holder

- 可使用於特定(單一)廠牌植體
 - 請切換為藍燈(Vortex專用)
- 表面活化時,必須打開植體ampule與Holder蓋子
 - 有32個品牌植體專用Holder



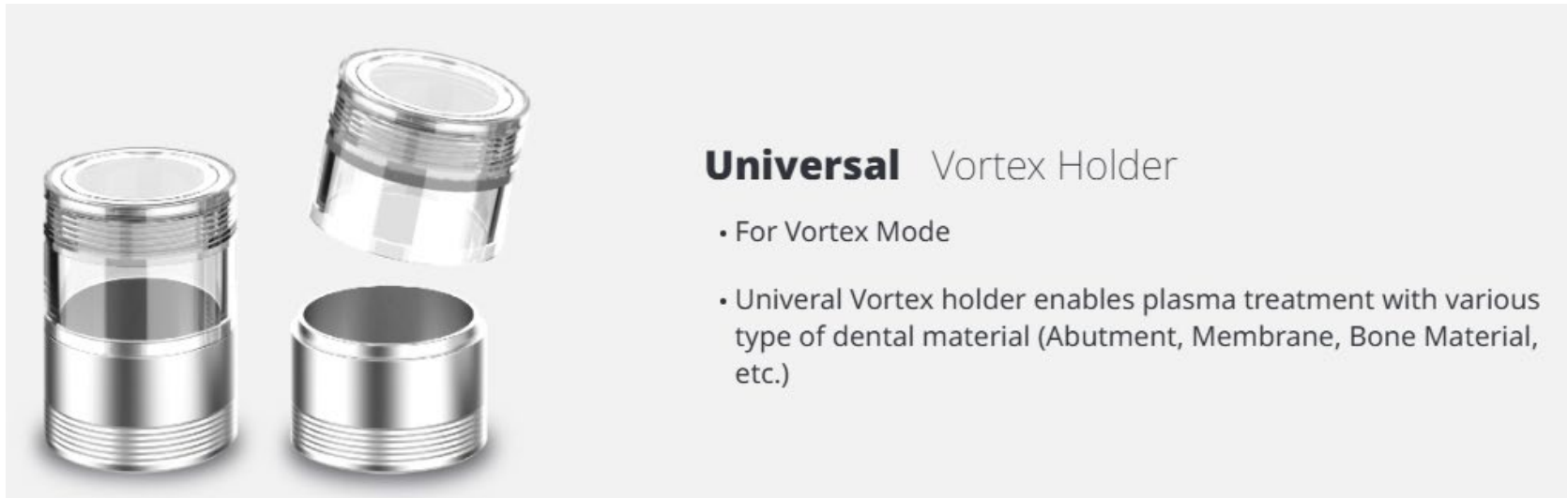
Implant Vortex Holder

- For Vortex Mode
- Customized for all kinds of implant brand
- Ampules for 32 brands

Ⅲ. 使用方法

Universal Vortex Holder (Dental Materials)

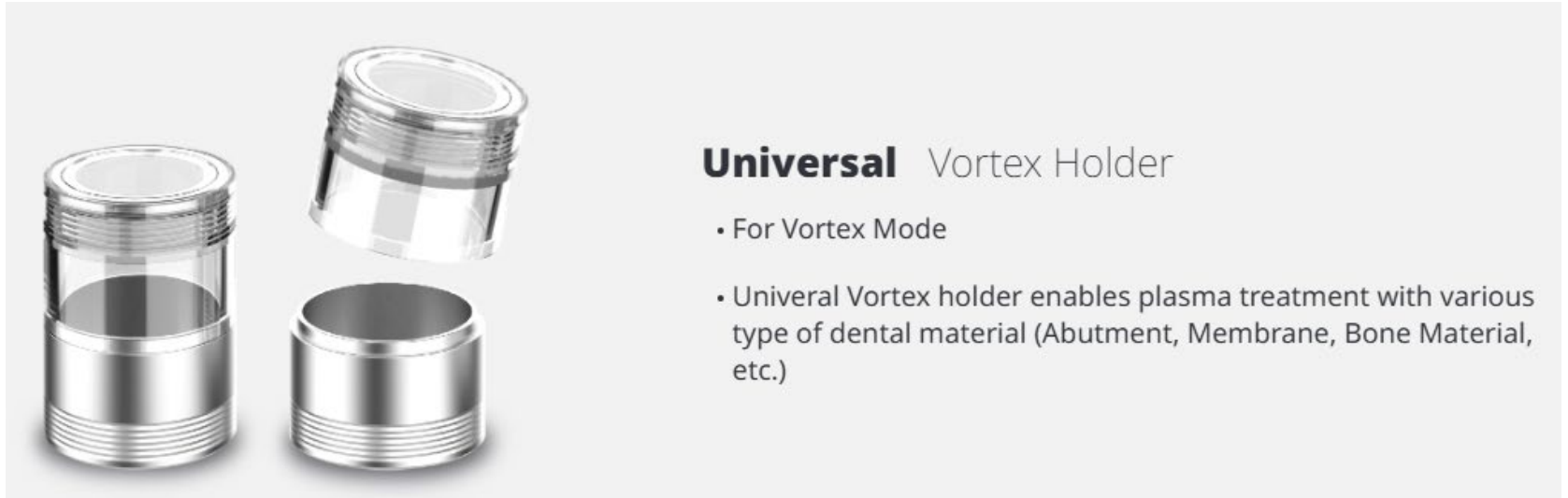
- 牙科材料的專用 Holder
- 請切換為藍燈 (Vortex專用)
- 可使用於Abutment/骨移植材料/Membrane/補綴物等



III. 使用方法

Universal Vortex Holder (Dental Materials)

- 牙科材料的專用 Holder
- 表面活化時,材料放進後必須關上 Holder 蓋子
 - 通過蓋子的磁鐵進行等離子體照射
- 可使用於 Abutment / 骨移植材料 / Membrane / 補綴物等
 - 使用骨粉或膜等物品時,一定要保持 Holder 乾燥



Universal Vortex Holder

- For Vortex Mode
- Universal Vortex holder enables plasma treatment with various type of dental material (Abutment, Membrane, Bone Material, etc.)

III. 使用方法

Vortex Holder



Vortex Holder 使用完畢後

- Holder 上下分離
- 清洗
- 滅菌
清洗後的產品充分乾燥後進行滅菌
也支持高壓蒸氣滅菌器
- 滅菌
將已完成滅菌的產品衝分去除水分

※※ 如果在水分未完全去除的情況下操作設備
可能會發生錯誤並導致故障

※※ 發生錯誤時, 請在去除水分後再使用

III. 使用方法



根據產品使用次數顯示前面LED狀態

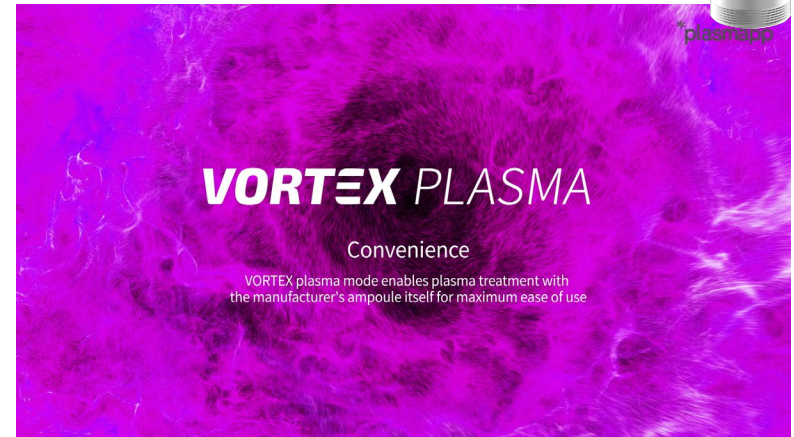
- 產品使用次數確認方法
長按上部請動按鈕(6秒以上), 根據產品前面使用次數, 綠色LED 會閃爍
- 產品使用次數顯示方法
適用次數每增加 500次, 綠色LED閃爍數量增加 1格
- 如果相應零件的更換壽命少於 100次, 則每次產品通電時都會發出“更換提示音”

* 参考 3. VORTEX Holder 使用影片

VORTEX Holder –
Fixture



VORTEX Holder –
Dental Material



IV. 問題發生



- 真空管下降後在進行前就馬上上升
有可能因手指或物品碰撞,真空管直接上升
這是保護機制並非產品出現問題,請再次按鈕使用



- 在活化進行過程中,異常發生時(3個紅燈)
請查看真空管是否有異物,擦乾異物後請再次按鈕使用



- 如在活化過程中,需強制終止時
相上方按鈕長按3秒,會顯示紅色LED燈後動作終止

- ※ 地面或桌面的水平角度過大也會引起產品的錯誤,請注意
- ※ 產品內部較敏感,請固定於同一個位置,請勿經常搬動

IV. 問題發生

紅色
LED
閃爍



- 超過產品使用次數後，工程開始時，產品前面顯示"紅色LED閃爍"狀態，產品無法運轉。

錯誤顯示及處置方法

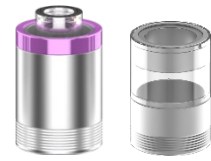
| 顯示錯誤 | 錯誤內容 | 確認及措施方法 |
|-----------|----------|-------------------------------------------------------------------|
| 1個紅色LED點亮 | 真空管運轉不良 | 電源OFF後重新啟動時，產品動轉將初始化。 |
| 3個紅色LED點亮 | 真空壓力異常 | 請去除真空管與底面之間的異物後，重新啟動。如果持續發生錯誤，請諮詢銷售負責人。 確認真空管破裂或彎曲等時，請諮詢銷售負責人。 |
| 5個紅色LED點亮 | 等離子體電源異常 | 電源OFF後重新啟動時，產品動轉將初始化。如果持續發生錯誤，請諮詢銷售負責人。 |

※用戶檢查及採取措施後仍存在相同現象時，請諮詢銷售負責人。

V. 注意事項

※產品本身不包含任何 **HOLDER**.

故購買產品時, 必需一起購買所使用的 **HOLDER**



Fixture
(專用)

Material
(專用)

非基本配備

V. 注意事項

- 使用次數：**50**次
- 低溫等離子體滅菌和高壓蒸氣滅菌均可使用
- 滅菌後需充分去除**Holder**表面的水分(殘留的水分會引起錯誤)
- 如果未正確垂直安裝, 會干擾下降的真空管, 造成損壞
- 連續使用時可能會對目標物體造成損壞, 因此電漿表面處理僅進行一次
- 由於產品磁力強, 請勿將尖銳物品、磁卡、電子設備等放置在周圍
- 熱量可能會引起磁力和變形等問題, 請勿曝露於130度以上環境





Before Treatment

After Treatment

THANK YOU

