The Harvest Smart PReP™ system versus the Friadent-Schütze platelet-rich plasma kit
Comparison of a semi-automatic method with a more complex method for the preparation of platelet concentrates

Key words: autologous, buffy coat, collection efficiency, platelet concentrate, platelet-rich plasma

Abstract: An important reason to improve methods for isolating platelet-rich plasma (PRP) is the potential use of autogenous platelet growth factors. In addition to the Curasan PRP kit (Curasan, Kleinostheim, Germany) and the platelet concentrated collection system (PCCSS™) system, two new methods for the preparation of PRP by the surgeon are now available. This study compared the suitability of these new methods for the preparation of PRP. Whole blood was drawn from 54 healthy donors (33 men and 21 women) aged 23–79 years (38.0 ± 17.7 years). PRP was prepared from each donor’s blood using both the Smart PReP™ system (Harvest Technologies Corporation, Munich, Germany) and the Friadent-Schütze method (PRP kit; Friadent-Schütze, Vienna, Austria). The platelet count in donor whole blood was 276,810 ± 59,440 platelets/m³. Platelet counts differed significantly between the Smart PRP preparation (122,789 ± 312,440 platelets/m³) and the Friadent-Schütze PRP preparation (144,050 ± 501,700 platelets/m³) (sign test, P < 0.001). The Smart PReP™ system had a significantly higher collection efficiency (63.4 ± 7.9%) than the Friadent-Schütze kit (49.6 ± 13.6%) (sign test, P < 0.001). The leukocyte contents in the two platelet concentrates were similar (Smart PReP™, 1,926 ± 8082 platelets/m³; Friadent-Schütze, 21,691 ± 16,430). Transforming growth factor (TGF)-β and platelet-derived growth factor (PDGF)-AB were higher in the Friadent-Schütze PRP (TGF-β, 196.8 ± 109.6 ng/ml; PDGF-AB, 251.6 ± 115.4 ng/ml) than in the Smart PReP™ (TGF-β, 77.2 ± 54.8 ng/ml; PDGF-AB, 208 ± 85.2 ng/ml). The sign test indicated significant differences between the two methods in the concentrations of TGF-β1 (P < 0.001) and PDGF-AB (P < 0.01). Insulin-like growth factor (IGF)-1 levels in the two PRP preparations were similar (Friadent-Schütze PRP, 72.8 ± 22.3 ng/ml; Smart PReP™, 91.4 ± 21.3 ng/ml). The Smart PReP™ system was superior with respect to ease of handling and preparation time. It also had a significantly higher platelet collection efficiency than the Friadent-Schütze PReP™ kit. The Friadent-Schütze PRP kit offers a slight advantage in the resulting PRP platelet concentration. However, this is easily compensated for in the Smart PReP™ system by reducing the volume of the resulting PRP.

Marx et al. [1998] found a radiographic and histologic increase in bone formation and bone density in 44 patients 6 months after autologous bone grafting using platelet concentrates [platelet-rich plasma, PRP] as a source of autologous growth factors. Cell culture studies have also shown a concentration-dependent increase in the proliferation rate of human osteoblast-like platelets after stimulation with platelets [Weibrich et al. 2001a].

Platelets are a physiological source of platelet-derived growth factor (PDGF) [Heldin et al. 1981; Singh et al. 1982], transforming growth factor (TGF)-β1 and TGF-β2 (Sporn & Roberts 1990), insulin-like growth
factor [IGF], epidermal growth factor [EGF] [Oka & Orth 1983; Kiuru et al. 1991] and a growth factor for hepatocytes [Russell et al. 1984, Nakamura et al. 1986]. In recent years, there has been a great deal of debate on the use of analog recombinant growth factors for periodontal and preprosthetic surgery [Lynch et al. 1991; Becker et al. 1992; Rutherford et al. 1993, Cho et al. 1995; Park et al. 1995]. Treatment with PRP to augment the osseointegration of endosseous dental implants has also been described [Rutherford et al. 1992; Anitua 1999]. To date, there have been some promising case reports [Kassolis et al. 2000], but only a limited number of controlled studies on the biological effect of PRP [Marx et al. 1998; Kim et al. 2002]. Platelets are not the only blood platelets that contain growth factors. In particular, white blood platelets (monocytes and neutrophiles) produce various growth factors, such as TGF-α [Grotendorst et al. 1989] and PDGF-similar proteins [Iida et al. 1996].

The clinical use of platelet concentrates obtained from transfusion medicine [by the discontinuous cell separation method] as a source of endogenous platelet growth factors is limited because of high levels of cardiovascular stress for elderly patients [Westphal 1984] and high production costs [Singbartl & Schleiner 1999]. In addition to established PRP production methods [The Curasan PRP kit [Curasan, Kleinhesseloher, Germany] and the PCCS system; Weibrich & Kleis 2002], two new methods for the production of PRP directly by the surgeon have recently become commercially available. These new methods are the Friadent-Schütze PRP kit [Friadent-Schütze, Vienna, Austria] and the Smart PRePTM system [Harvest Technologies GmbH, Munich, Germany]. Similarly to the Curasan PRP kit and PCCS system, they concentrate platelets and leukocytes to different extents. However, there are no data for these PRP production methods on the resulting platelet and leukocyte concentrations, collection efficiencies, and growth factor contents.

Therefore, this study examined the abilities of the Smart PRePTM system and the Friadent-Schütze method to prepare PRP, with regard to handling [risk of injuries, training required for staff, preparation time, volume of PRP] and the composition of the end-product [platelet, leukocyte, erythrocyte and growth factor concentrations].

Material and methods

Between 22 June and 16 July 2001, blood samples were collected from 54 donors [33 men and 21 women] aged 23–59 years [mean 38 ± 18], who had no relevant diseases. All donors included in this study had platelet counts > 150 000 platelets/μl. The Smart PRePTM system and the Friadent-Schütze PRP kit were used to produce PRP from donor whole blood.

Volunteers gave written informed consent, as required by our Institute's Ethics Board. Before venipuncture, 7 ml of adenosine-citrato-dextrose-acid (ACD-A) solution was drawn into a 60-ml syringe. Venipuncture was then performed using an 18-G apheresis needle from the Smart kit. Blood was drawn into several containers in the following order: [1] the 60-ml syringe, filled with 52 ml whole blood for females [the blood chamber of the Smart PRePTM is standardized for a specific red blood cell volume, and therefore more blood is needed in females because of the lower hematocrit] and 48 ml whole blood for males, [2] an 8.5-ml adenosine-citrate-dextrose (ACD) vacutainer [Becton-Dickinson, Heidelberg, Germany, Cat. No. 364606], and [3] a 2.7-ml EDTA monovette [Sarstedt, Nümbrecht, Germany, Cat. No. 05.1167]. The blood-filled syringe and ACD vacutainer were inverted five or six times to ensure that the anticoagulants (ACD-A and ACD) were evenly dispersed. The whole blood contained in the 60-ml syringe was used to prepare 7 ml PRP, as recommended by the manufacturer of the Smart PRePTM system [see below for method]. The whole blood contained in the 8.5-ml ACD vacutainer was used to prepare 0.8 ml PRP by the method recommended by Friadent-Schütze using materials analogous to those contained in the Friadent-Schütze vacutainer PRP kit [see below for method]. The platelet counts of the whole blood and the platelet concentrates were determined automatically [Cell Dyn 3500, Abbott Diagnostics, Wiesbaden, Germany].

Preparation of platelet concentrates using the Smart PRePTM system

The Smart PRePTM system

The Smart PRePTM system contains the following materials: an SMP-1000i centrifuge [Harvest Technologies] with a two-place swinging rotor for specially designed inserts [Fig. 1], an ACD bottle, and a PRP-1 tray pack. The latter is delivered in a sterile box that contains the following: [1] a 16-G needle for adding ACD to the 60-ml syringe, [2] a 60-ml syringe for collecting whole blood, [3] a 17-G needle set for collecting whole blood, [4] a blunt plastic needle for adding the anticoagulated blood to the processing device, [5] a plastic device for processing the blood, [6] two 30-ml syringes for resuspending and collecting the platelet concentrate, and [7] two blunt cannulas that are used in these procedures.

PRP preparation using the Smart PRePTM system

PRP was produced by the method recommended by the manufacturer. Anticoagulated whole blood (52 ml for females and 48 ml for males) was transferred to the blood chamber, and 2 ml ACD was placed in the plasma chamber of the disposable blood processor (DP). The DP and a counter-balance were placed into swinging rotor cups in the centrifuge. The two-step centrifugation process was completed in 13 min, and the whole blood chamber contained almost all of the erythrocytes. The bottom of the plasma chamber contained some erythrocytes. The platelet pellet was above the erythrocytes, and the platelet-poor plasma (PPP) was at the top of the chamber. Most of the PPP is not needed to resuspend the platelet pellet and was removed using the first 30-ml syringe with a blunt cannula and one of the pre-attached spacers. A volume of about 7 ml PPP was left in the plasma chamber. To resuspend the residual PPP, the platelets and erythrocytes were withdrawn into the second 30-ml syringe with a blunt cannula (no spacers) and gently re-added to the plasma chamber until the platelets were adequately suspended. The final platelet concentrate (PC) was transferred to Eppendorf tubes for later analysis.

Preparation of platelet concentrates using the Friadent-Schütze vacutainer kit

The Friadent-Schütze vacutainer kit

The components of the Friadent-Schütze kit were not ordered from the distributor, but were purchased directly from the manufacturers. The PRP kit consists of a ‘multify set’ [Cat. No. 85.1637.005] from Sarstedt and the following parts from
Braun (Melsungen, Germany): two 0.8 x 120 mm injection needles (Ref. No. 4665643), a 0.8 x 80 mm injection needle (Ref. No. 4665465), and two intake air cannu-lulas (Ref. No. 4190017). The following parts from Becton-Dickinson are also included in the kit: an 8.5 ml ACD vacutainer (glass vacuum tube, Ref. No. 364606), a 7 ml neutral vacutainer (Ref. No. 367615), and two Luer adapters (Ref. No. 367300). As the samples were not for clinical use, we employed intake air cannu-lulas without sterile filters (Braun, Ref. No. 4665457).

PRP preparation using the Friadent-Schütze vacutainer kit
To produce PRP extracts, 8.5 ml of citrated blood (8.5 ml ACD vacutainer, Becton-Dickinson) was centrifuged in a standard laboratory centrifuge (Heraeus Labofuge 300, Kendro Laboratory Products, Osterrode, Germany) for 10 min at 24000 r.p.m. Subsequently, the yellow plasma (containing the platelets) was taken up into a monovette with a long cannula using an additional air-intake cannula. To combine the platelets into a single pellet, a second centrifugation step was performed with the second vacutainer for 15 min at 36000 r.p.m. The plasma supernatant (containing relatively few platelets) was then reduced to approximately 0.8 ml (again with a long cannula and an air-intake cannula). The platelet pellet was resuspended in the remaining 0.8 ml of plasma using a conventional laboratory shaker (MS 1 Minishaker, IKA, Staufen, Germany). The PC was transferred to Eppendorf tubes for later analysis.

Measurement of growth factor levels
The PRP samples were stored in Eppendorf tubes at −78°C. Immediately before analysis of growth factor content, the samples were thawed and centrifuged for 10 min at 10000 r.p.m. in a microcentrifuge. Commercially available enzyme-linked immunosorbent assay kits that have been validated for measuring their respective growth factors (Quantikine ELISA kit, R&D Diagnostics, Wiesbaden, Germany) were used according to the manufacturer’s instructions to quantify the concentrations of TGF-β1 (Cat. No. #DB100), PDGF-AB (#DH800), and IGF-I (#DG100), as previously described (Weibrich et al. 2001b). All growth factor measurements were performed in duplicate. No unexpected scattering of the data (all scattering < 10%) was observed. The lower detection limits of these assays reported by the manufacturer are 7 pg/ml for TGF-β, 8.4 pg/ml for PDGF-AB, and 0.0264 ng/ml for IGF-I. Since a large proportion of the TGF-β1 in biological samples is often present in latent form (Roberts & Sporn 1990), TGF-β1 was converted to its active form as directed by the manufacturer in order to estimate the total TGF-β1 content.

Statistical methods
All quantitative measurements are described using summary statistics (n, mean, standard deviation, median, minimum, maximum, and other quantiles). The three platelet counts (donor whole blood, Smart PRePTM PRP, and Friadent-Schütze PRP) were compared using the sign test for non-parametric, paired data. Spearman’s correlation coefficient (rS) with the respective P-values was used to demonstrate the relationship between the platelet and leucocyte counts in PRP and growth factor levels. To account for multiplicity, the P-values were compared with the Bonferroni-adjusted significance level of 0.05/3 = 0.0167. The collection efficiency is the percen-
system required 7.5 ml of whole blood. The mean hematocrit of all donors was 43.9 ± 3.8% (mean ± SD). The preparation of PRP required about 20 min using the Smart PRePTM system and 40 min using the Friadent-Schütze method. The platelet count in donor whole blood was 276810 ± 59440 platelets/μl. Platelet counts differed significantly between the Smart PRP preparation (1227890 ± 312440 platelets/μl) and the Friadent-Schütze PRP preparation (1440500 ± 501700 platelets/μl) [sign test, \( P < 0.001 \)] [Fig. 1]. The Smart system had a higher platelet collection efficiency (63.4 ± 7.9%) than the Friadent-Schütze kit (49.7 ± 13.6%) [sign test, \( P = 0.001 \)]. The concentrations of white blood platelets in the two platelet concentrates were similar [Smart, 19.261 ± 8082 platelets/μl; Friadent-Schütze, 21.691 ± 16430 platelets/μl], but much lower in whole blood (5978 ± 2123 platelets/μl) [Fig. 2]. Correlation analyses confirmed the hematocrit-dependent construction of the Smart PRePTM system: the higher the hematocrit of the donor whole blood, the higher the red blood cell count in the resulting PRP [\( r_s = 0.675, P < 0.001 \)] [Fig. 3]. The Friadent-Schütze system is much less hematocrit dependent, because the amount of plasma drawn after the first centrifugation process can be varied individually. Collection efficiency was not affected by hematocrit in our healthy donors [Table 1].

All three growth factors analyzed were found at high levels in both PRP preparations, but the relative amounts of individual growth factors differed. TGF-β1 and PDGF-AB were higher in the Friadent-Schütze PRP preparation [TGF-β1, 196.8 ± 109.6 ng/ml; PDGF-AB, 251.6 ± 115.4 ng/ml] than in the Smart PRePTM PRP preparation [TGF-β1, 77.2 ± 54.8 ng/ml; PDGF-AB, 208.3 ± 85.2 ng/ml]. The difference was significant for TGF-β1 [\( P < 0.001 \)] and PDGF-AB [\( P < 0.01 \)]. IGF-I levels in the two PRP preparations were similar [Friadent-Schütze PRP, 72.8 ± 22.3 ng/ml; Smart PRePTM, 91.4 ± 21.3 ng/ml] [Fig. 6]. Scatter plots and Spearman correlation analysis revealed a clear relationship between the platelet counts of the PRP and the corresponding growth factor levels for TGF-β1 and PDGF-AB, but not for IGF-I [Table 1].

### Results

The volumes of whole blood collected for the Smart PRePTM PRP system (excluding anticoagulant) were 48 ml for males and 52 ml for females. The Friadent-Schütze system required 7.5 ml of whole blood. The mean hematocrit of all donors was 43.9 ± 3.8% (mean ± SD). The preparation of PRP required about 20 min using the Smart PRePTM system and 40 min using the Friadent-Schütze method. The platelet count in donor whole blood was 276810 ± 59440 platelets/μl. Platelet counts differed significantly between the Smart PRP preparation (1227890 ± 312440 platelets/μl) and the Friadent-Schütze PRP preparation (1440500 ± 501700 platelets/μl) [sign test, \( P < 0.001 \)] [Fig. 1]. The Smart system had a higher platelet collection efficiency (63.4 ± 7.9%) than the Friadent-Schütze kit (49.7 ± 13.6%) [sign test, \( P = 0.001 \)]. The concentrations of white blood platelets in the two platelet concentrates were similar [Smart, 19.261 ± 8082 platelets/μl; Friadent-Schütze, 21.691 ± 16430 platelets/μl], but much lower in whole blood (5978 ± 2123 platelets/μl) [Fig. 2]. Correlation analyses confirmed the hematocrit-dependent construction of the Smart PRePTM system: the higher the hematocrit of the donor whole blood, the higher the red blood cell count in the resulting PRP [\( r_s = 0.675, P < 0.001 \)] [Fig. 3]. The Friadent-Schütze system is much less hematocrit dependent, because the amount of plasma drawn after the first centrifugation process can be varied individually. Collection efficiency was not affected by hematocrit in our healthy donors [Table 1].

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### Table 1. Spearman’s correlations for the platelet counts and growth factor contents in the two PRP preparations

<table>
<thead>
<tr>
<th>Platelet count</th>
<th>PDGF-AB</th>
<th>TGF-β1</th>
<th>IGF-I</th>
</tr>
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<tbody>
<tr>
<td>Smart PRePTM</td>
<td>n.s.</td>
<td>0.317</td>
<td>n.s.</td>
</tr>
</tbody>
</table>
| Friadent-Schütze | 0.796 | n.s.  | –0.438| \( P < 0.005 \)
| Leukocyte count | 0.270  | n.s.  | –0.522| \( P < 0.005 \)

**Fig. 3.** Scatter plot of the relationship between hematocrit in whole blood and the resulting erythrocyte count in Smart PRePTM PRP.

**Fig. 4.** Box plot of the growth factor contents in Smart PRePTM PRP and Friadent-Schütze PRP (circles = outliers; stars = extreme values).
Discussion

This study evaluated the differences between two systems (Figs 5 and 6) for producing PRP directly by the surgeon with regard to the recommended methods and the resulting PRP. After preparing 54 PRP specimens, the authors believe that the Smart PRePTM system is more suitable from a clinical point of view, because the kit was easier to handle, even if the concentrations of platelets and growth factors obtained using the Friadent-Schütze PRP kit were superior for these settings. The Smart PRePTM system offers many advantages. The platelet collection efficiency was higher, which is a criterion for the quality of a PRP preparation system. The 7ml of PRP that is produced using one tray pack from the Smart PRePTM kit would be sufficient for most dentoalveolar procedures, in the authors’ clinical experience. Using the Friadent-Schütze PRP kit, up to eight vacutainers would be required to produce an equal volume of PRP. This would increase the number of working steps during PRP production. The required preparation time would be shorter with the Smart PRePTM system than with the Friadent-Schütze PRP kit, especially in clinical situations when more than one vacuum container [0.8 ml PRP] is needed. Because the Smart PRePTM system uses blunt needles, there is no risk of injury to staff from contaminated needles once the blood has been drawn. PRP preparation using the Smart PRePTM system is semiautomatic, because a two-step centrifugation procedure is performed by the machine. This means that PRP production using the Smart PRePTM system requires little training, and diminishes the possibility of mistakes by staff. In contrast, the Friadent-Schütze PRP kit requires much more training and many preparation steps, which means that there is a higher failure rate.

The Smart PRePTM system has been developed and licensed as a therapeutic instrument for PRP preparation, whereas the components of the Friadent-Schütze PRP kit (vacutainer and laboratory centrifuge) are considered diagnostic tools.

If higher concentrations of platelets and growth factors are needed while using the Smart PRePTM kit, the 7-ml volume that remains in the plasma chamber before re-suspension can be reduced by removing a greater volume of the PPP. The architecture of the Smart PRePTM disposable blood processor reveals the reason for the hematocrit dependence of the kit. Our results show that a high hematocrit leads to a high number of erythrocytes in the PRP preparation. This is not expected to disrupt wound healing in any way or to reduce the platelet or leukocyte counts in the end-product for healthy donors. However, if the hematocrit were extremely low [in traumatic or chronic diseases, such as renal insufficiency, splenomegaly, renal dialysis, or mechanical cardiac valve replacement], the buffy coat layer [containing many platelets] would be located with the erythrocytes below the separation plate of the blood chamber after the first centrifugation process. Therefore, it would not be transferred to the plasma chamber. This might lead to an extremely inefficient separation process.

The Friadent-Schütze PRP kit is very similar to the Curasan PRP kit. Both kits use the same needles and air intake canulas and employ a common laboratory centrifuge. The recommended separation and concentration procedures are identical. The main difference is in the optional use of siliconized glass vacutainers [used in this study] instead of the Sarstedt monovettes provided with the Curasan PRP kit. The collection efficiency of the Friadent-Schütze PRP kit (49.7 ± 13.6%) seems to be higher than that of the Curasan PRP kit (17.6 ± 9.9%). This minor difference might be caused by platelet attachment to the wall of the Sarstedt monovettes in the Curasan PRP kit. However, this phenomenon seems to be minimized by the inner silicon layer of the glass tubes used in the Friadent-Schütze vacutainer PRP kit. The PCCS system gave a collection efficiency of [68.5 ± 22.1%] [Weibrich & Kleis 2002].

A comparison of the results presented here with data for other PRP production systems [blood bank PRP produced by discontinuous cell separation and Curasan PRP] reveals that the blood bank PRP contains the highest levels of TGF-β1 [blood bank, 268.7 ± 70.8 ng/ml; Curasan, 95.0 ± 60.7 ng/ml], and that the Friadent-Schütze PRP contains the highest levels of PDGF-AB [blood bank, 133.6 ± 46.3 ng/ml; Curasan, 233.7 ± 111.9 ng/ml]. The content of IGF-I is similar in all PRP preparations [Curasan, 101.7 ± 47.7 ng/ml; blood bank, 85.4 ± 25.6] [Weibrich et al. 2001b].

Because the Smart PRePTM system is the only PRP production system [compared to the Curasan PRP kit and Friadent-Schütze PRP kit] that is at least semiclosed, this system is preferable from a clinical point of view, even if it does not generate the highest levels of growth factors in the analyzed setting. The Smart PRePTM system is developed and licensed as a therapeutic system, it produces a higher amount of PRP in one production process and it reduces possible contamination risks of the resulting PRP.

Conclusions

We compared the preparation methods of the Smart PRePTM system and the Friadent-Schütze vacutainer PRP kit and preferred the Smart PRePTM system because of its ease of handling and short preparation time. The Smart PRePTM system had a significantly higher platelet collection efficiency than the Friadent-Schütze PRP kit. The Friadent-Schütze PRP kit offers a slight advantage in a higher resulting PRP platelet concentration. However, this is easily compensated for in the Smart PRePTM system by reducing the volume of the resulting PRP.

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Résurné

Une raison important pour améliorer les méthodes d’isolation du plasma riche en plaquettes (PRP) est l'utilisation potentielle des facteurs de croissance des plaquettes autogènes. En plus du kit PRP Curasan et du système PCSS, deux nouvelles méthodes pour la préparation de PRP par le chirurgien sont disponibles. Cette étude compare ces deux méthodes pour la préparation de PRP. Du sang a été prélevé chez 53 hommes et 21 femmes âgés de 23 à 79 ans (âge moyen = 68 ans). Le PRP a été préparé à partir du sang de chaque donneur en utilisant l’un des systèmes PRePTM [Harvest Technologies Corporation, Allemagne] que la méthode Friadent-Schütze (PRP kit, Friadent-Schütze, Autriche). Le comptage des plaquettes dans le sang complet du donneur était de 276,810 ± 259,3 μL. Le système Harvest avait une efficacité de collecte supérieure ([53 ± 6%] au kit Friadent-Schütze (50 ± 24%) test de signe, p<0,001). Les teneurs en leucocytes dans les deux concentrations de plaquettes étaient semblables (Harvest, 296,61 ± 808,2 μL et Friadent-Schütze 21691 ± 6430 μL). TGF-β1 et PDGF-AB étaient plus élevés dans le PRP Friadent-Schütze (TGF-β1, 197 ± 107 ng/mL, PDGF-AB, 253 ± 115 ng/mL) que dans le PRP Smart-PRePTM (TGF-β1, 77 ± 55 ng/mL, PDGF-AB, 208 ± 85 ng/mL). Le test du signe indiquait des différences significatives entre les deux méthodes dans la concentration de TGF-β1 (p<0,001) et PDGF-AB (p<0,001). Les teneurs en IGF-1 dans les deux préparations de PRP étaient semblables (Friadent-Schütze PRP, 73 ± 23 ng/mL, Smart PReP AB ± 23 ng/mL). Le système Smart PReP TM était le meilleur système vu sa facilité de maniement ainsi que le temps de préparation. Le système Smart PRePTM avait une efficacité de collecte des plaquettes significativement plus élevée que le kit PRP Freident-Schütze. Le kit PRP Freident-Schütze offrait un avantage légèrement supérieur dans la concentration de plaquettes PRP obtenue. Ceci est cependant aisément compensé pour le système Smart PRePTM en réduisant le volume du PRP resultant.

Resumen

Una razón importante para mejorar los métodos para aislar el plasma rico en plaquetas (PRP) es el uso potencial de los factores autógenos plaquetarios de crecimiento. Además del kit Curasan PRP y el sistema PCSS, hay dos nuevos métodos disponibles para la preparación de PRP por el cirujano. Este estudio comparó la adecuación de estos nuevos métodos para la preparación de PRP. Se extrajo sangre de 54 donantes sanos (33 hombres, 21 mujeres) edades 23 a 79 años (18 ± 17). Se preparó el PRP de la sangre de cada donante usando tanto el sistema PRePTM [Harvest Technologies Corporation, Alemania] como el sistema Friadent-Schütze (PRP kit, Friadent-Schütze, Austria). El recuento de plaquetas en la sangre entera del donante fue de 276,810 ± 259,4 μL. El recuento de plaquetas difirió significativamente entre la preparación Harvest PRP (1,227,80 ± 312,44 μL) y la preparación Friadent-Schütze PRP (1,440,50 ± 510,700 μL) (sign test, p<0,001). El contenido de leucocitos en los dos concentrados de plaquetas fueron similares (Harvest, 19,361 ± 8,083 μL/Friadent-Schütze, 21,691 ± 16,430 μL). El TGF-β1 y el PDGF-AB fueron mayores en el kit de preparación Friadent-Schütze (TGF-β1, 196 ± 109,6 ng/mL, PDGF-AB, 215 ± 115,4 ng/mL) que en el kit de preparación Harvest PRP (TGF-β1, 77 ± 54,8 ng/mL, PDGF-AB, 208 ± 85,2 ng/mL). El test de sign demostró diferencias significativas entre los dos métodos en la concentración de TGF-β1 (p<0,001) y PDGF-AB (p<0,001). Los niveles de IGF-1 fueron similares en las dos preparaciones (Friadent-Schütze PRP, 78,3 ± 23,3 ng/mL, Smart PRePTM, 91,4 ± 21,7 ng/mL). El sistema Smart PRePTM fue el sistema mejor con respecto a su facilidad de manejo y tiempo de preparación. El sistema Smart PRePTM tuvo una mayor eficiencia en la recolección de plaquetas que el kit Freident-Schütze PRP. El kit Friadent-Schütze PRP ofrece una ligera ventaja en la concentración de plaquetas PRP resultante. De todos modos, este se compense fácilmente para el sistema Smart PRePTM reduciendo el volumen del PRP resultant.