

Bolígrafos y capuchones conectados

Recomendaciones de Expertos del Área de Diabetes Mellitus de la
Sociedad Española de Endocrinología y Nutrición

Cristina Tejera-Pérez
Ana Chico-Ballesteros
Sharona Azriel-Mira
Beatriz Lardiés-Sánchez
Fernando Gómez-Peralta
En representación del Área de
Diabetes-SEEN





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Justificación



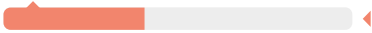
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Problema adherencia a insulina

T1D Exchange 43% PCDM1 omite +1 bolo/ semana



Basal 22% dosis omitidas en PCDM1/ 14 días



Timing administración insulina



Antes de las comidas

PCDM1 88,6%

PCDM2 68,7%

Cumplimiento objetivos

PCDM1 (SED1) 70% PCDM1 HbA_{1c} > 7%



PCDM2 >50% PCDM2 HbA_{1c} > 7%



Relación entre adherencia y objetivos



Omisión 2 bolos/semana: \uparrow 0,3-0,4% HbA_{1c}



Omisión 2 dosis basal/semana \uparrow 0,2-0,3% HbA_{1c}

PCDM1: personas con DM1. PCDM2: personas con DM2.

Mayor variabilidad glucémica, peor grado cumplimiento objetivos glucometría, complicaciones, peor calidad de vida, ...





Evolución a ecosistema digital en diabetes



Bolígrafos / plumas conectados

Principales características



	ESYSTA BT pen ®	Pendiq 2.0 ®	NovoPen 6 ®	NovoPen Echo Plus ®	InPen ®
Compañía	Emperra	Pendiq	Novo Nordisk	Novo Nordisk	Companion, Medtronic
Aprobación	Marcado CE	Marcado CE	Marcado CE	Marcado CE	FDA, Mercado CE
Insulinas compatibles	Cualquier insulina en cartucho mediante adaptador	Cartuchos de Lilly, Sanofi y Novo Nordisk	Novorapid®, Fiasp®, Tresiba® (penfill)	Novorapid®, Fiasp®, Tresiba® (penfill)	Humalog®, Novorapid®, Fiasp®
Incrementos de dosis	1 UI	0,1 UI	1 UI	0,5 UI	0,5 UI
Dosis máxima	60 UI	60 UI	60 UI	30 UI	30 UI
Muestra unidades última dosis	Sí	Sí	Sí	Sí	Sí
Conexión con aplicaciones o móvil	Sí	Sí	Sí	Sí	Sí
Dosis insulina activa	No	No	No	No	Sí
Recordatorio de bolo	No	No	No	No	Sí
Calculador de bolo	No	No	My Sugr Social Diabetes en proceso	My Sugr Social Diabetes en proceso	Sí
Integración con MCG	No	No	Glooko	Glooko	Sí (Guardian Connect System) Glooko: iOS, Dexcom Clarity (iOS)
Integración con FreeStyle Libreview® / LibreLink®	No	No	Sí	Sí	No
Conectividad	Bluetooth®	Bluetooth®	NFC	NFC	Bluetooth®
Duración de la batería	6- 12 meses	Recargable	5 años	5 años	1 año
Página web	https://www.emperra.com/en/	https://pendiq.com/en/home/	https://www.novonordisk.com/our-products/smart-pens/novopen-6.html	https://www.novonordisk.com/our-products/smart-pens/novopen-6.html	https://www.medtronicdiabetes.com/products/inpen-smart-insulin-pen-system

MCG: monitorización continua de glucosa. NFC: near-field communication. CE: Conformité Européenne. FDA: Food and Drug Administration



Capuchones conectados

Principales características



	GoCap ®	Insulcheck Connect ®	Clipsulin ®	Mallya ®	InsulClock ®
País de origen	Estados Unidos	Irlanda	Estados Unidos	Francia	España
Aprobación	FDA	Marcado CE FDA		Marcado CE (medical device, class IIb)	Marcado CE
Compatibilidades con insulina	SoloStar, FlexPen, KwikPen	FlexPen, KwikPen, SoloStar, NovoPen 3/4/5/Echo, Luxura HD, Savvio, KlikSTAR	SoloStar, KlikSTAR, KwikPen, Luxura, FlexPen, FlexTouch	Solostar, Kwikpen, Flexpen	KwikPen, FlexTouch, Flexpen SoloStar
Smartphone compatibles	Apple, Android	Apple, Android	Apple, Android	Apple, Android	Apple, Android
Conectividad	Bluetooth	Bluetooth	Bluetooth	Bluetooth	Bluetooth
Monitor de temperatura temperatura	Sí	Sí	No	No	Sí
Recordatorio de la inyección de insulina	Sí	No	No	Sí	Sí
Calculadora de dosis en bolo	No	No	No	No	No
Integración con MCG	FSL	Socialdiabetes	Glooko	MySugr	Puede tener conexión
Duración de la batería	1 año	Reemplazable	1.800 inyecciones	Recargable durante 2 años, luego reemplazable	Recargable

¿Qué perfiles de personas con DM pueden beneficiarse ?



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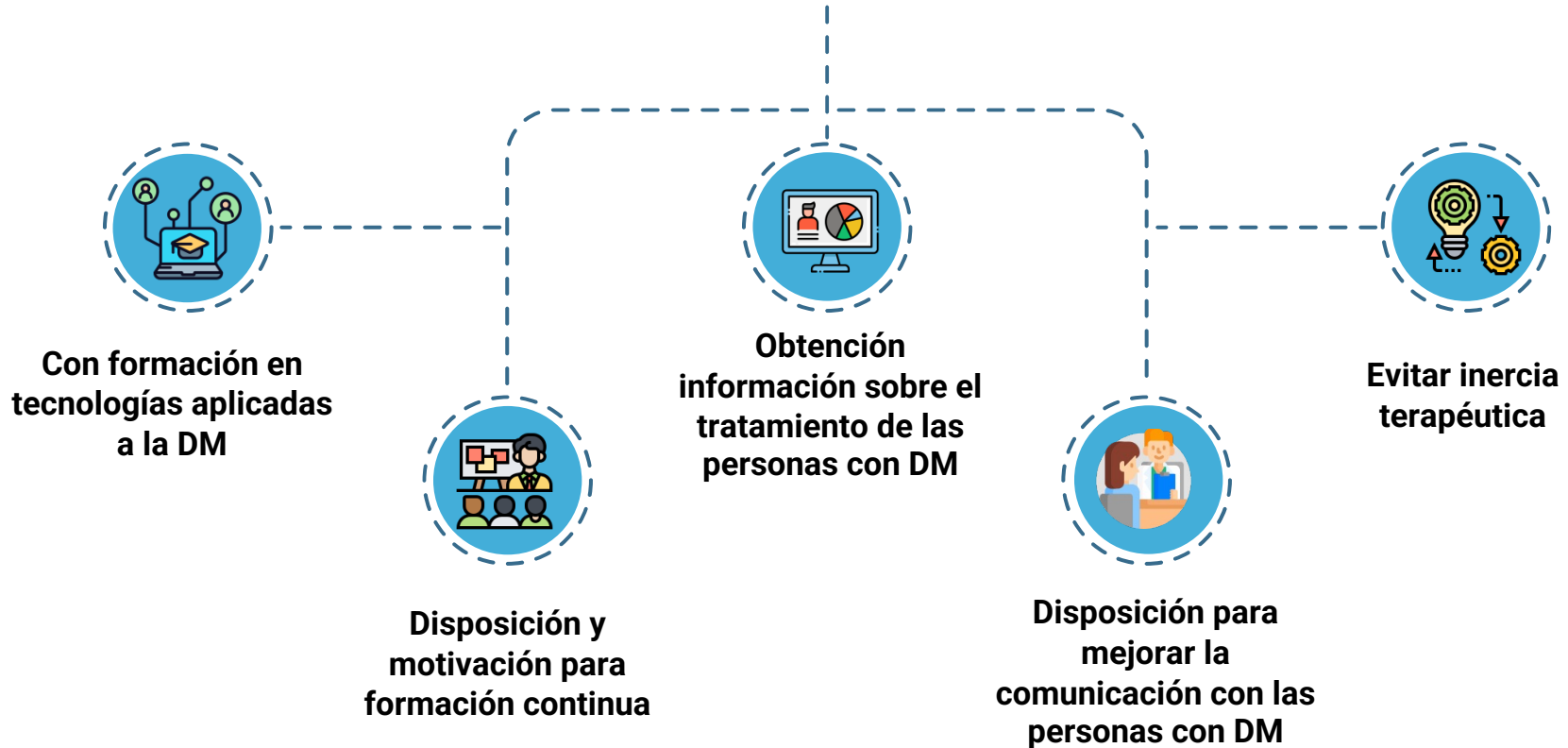
TIR: time in range
TAR: time above range
TBR: time below range



Perfil del profesional sanitario para el uso de bolígrafos y capuchones conectados



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Mínimos del informe integrado



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Objetivos TIR

Gráfico de barras apiladas con objetivos TIR, estandarizados/ personalizados

Perfil AGP

AGP con datos añadidos de ratios de insulina, factor de sensibilidad y objetivo de glucemia (en función de tramos horarios)



Datos glucometría

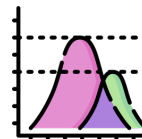
Glucemia media, GMI, porcentaje coeficiente de variación



Análisis insulina basal y bolos

Basal: dosis media, momento de administración, glucemia nocturna < 71 mg/dL, glucemia media desde el momento de acostarse hasta levantarse

Bolos: bolos/ingesta, dosis media, ratio insulina-hidratos de carbono, momento administración, bolos omitidos



Métrica de insulina

Dosis media diaria, media de insulina basal, media bolos, dosis administradas, bolos/día, uso calculador, dosis administrada.

Perfiles diarios

P₅₀ datos de glucemia, con superposición de tramos horarios: ingestas hidratos de carbono, insulina basal, bolos prandiales, bolos correctores, dosis calculada vs administrada, duración bolo, barra apilada AGP, recuento hidratos de carbono, reparto dosis insulina (basal/ bolo)



Desafíos para la implantación de bolígrafos y capuchones conectados



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Persona con DM



Profesionales

Sistema Sanitario



Dispositivo



- Preferencia del paciente por el uso de sistemas más sencillos
- Inversión económica en el dispositivo.
- Necesidad de soporte de educación diabetológica avanzada.
- Conocimientos digitales mínimos.
- Disponibilidad de soporte digital como teléfono móvil compatible, así como mantenimiento actualizado de las aplicaciones.
- Falta de formación de los sanitarios responsables del paciente en cuanto a herramientas digitales.
- Falta de cobertura por parte de los sistemas sanitarios.
- Falta de motivación del paciente y/o su equipo sanitario.

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